

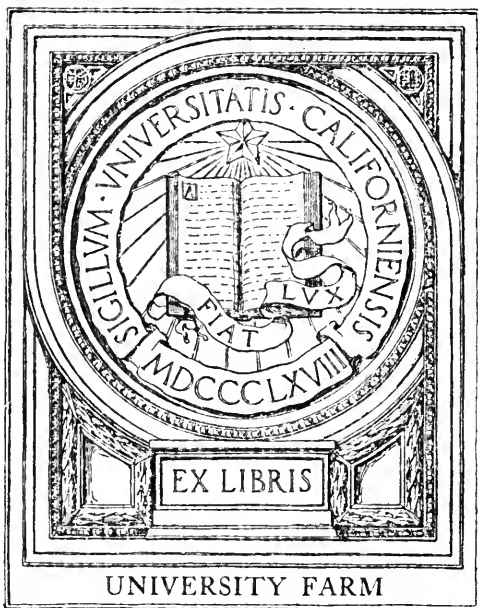
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THE RURAL EFFICIENCY GUIDE





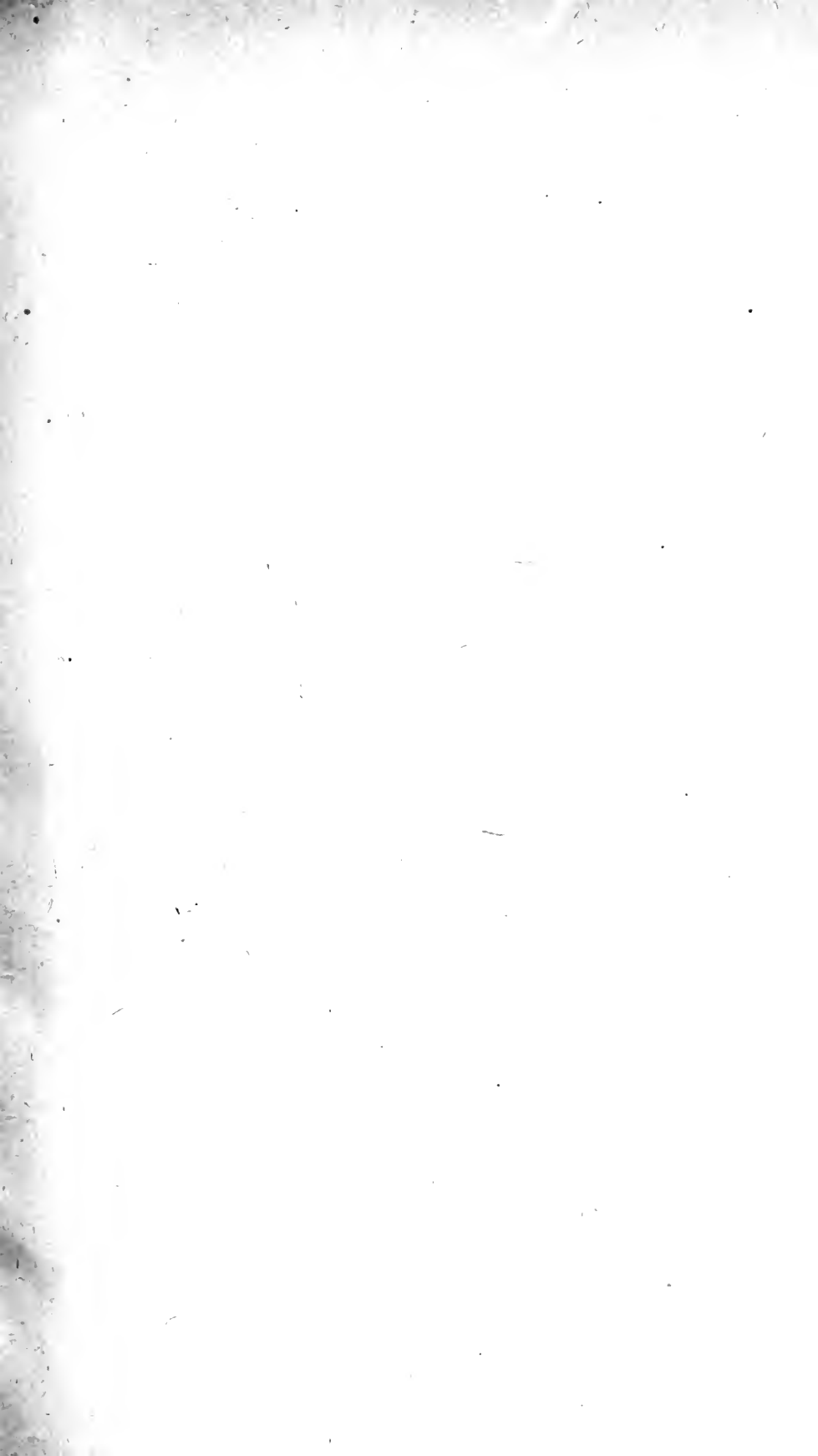
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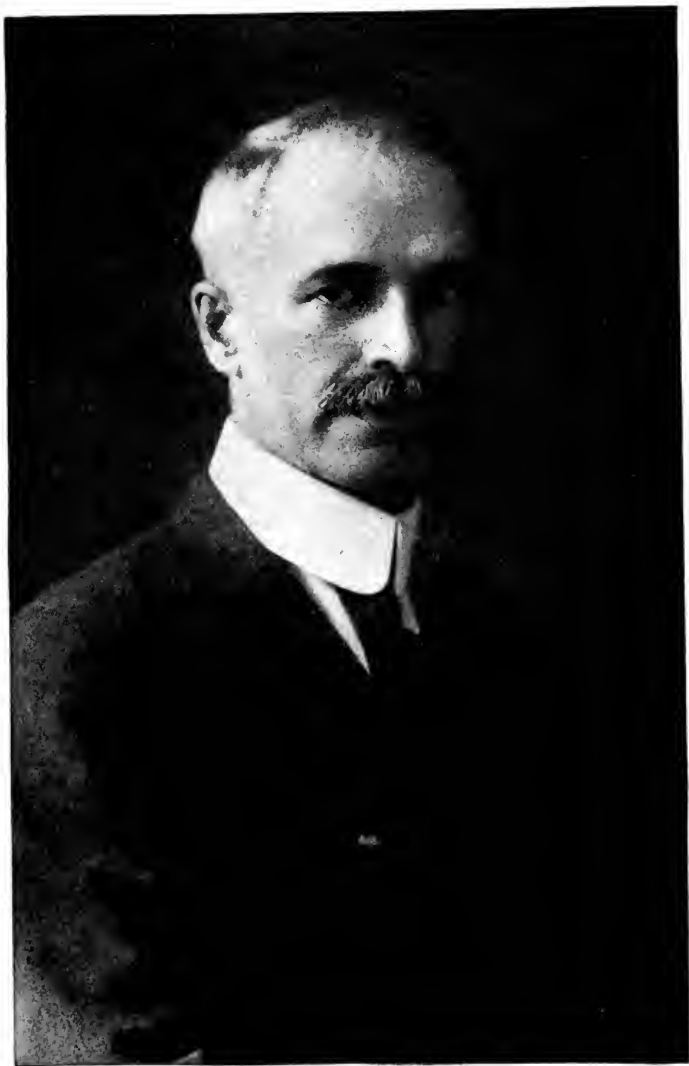
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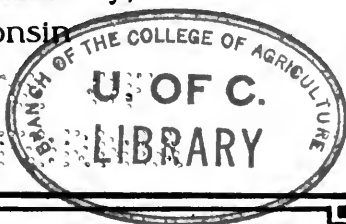
· THE RURAL · EFFICIENCY GUIDE

Volume 4 STOCK BOOK

BY

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THE PEOPLES EFFICIENCY
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TO VIND
AVROTHA

AUTHOR'S PREFACE

THERE never was a time in the history of the world when it was so necessary for the breeder and stock raiser to be efficient in his work. He must not only raise better and more stock, but be able to save the great losses which are occurring every year from preventable diseases. The magnitude of the Animal Husbandry interests may be judged from the manufacture of meat products. In the United States alone during the year 1909 the value of the meat products of the slaughter and packing industries or establishments amounted to the enormous sum of \$1,370,568,000. In value of the products turned out, these industries stand at the head of all the manufacturing interests of the country.

The butter, cheese and condensed milk industries turn out products valued at \$274,558,000 per year, and yet such an eminent authority as Prof. Haecker, of the Minnesota Experiment Station, makes the statement that the milk producers of his state are, losing all their profits simply because of lack of understanding of "how to feed." The time has come when only those who understand feeding are in a position to realize the maximum profits from live stock. The food problem lies at the very basis of success in all forms of animal husbandry. The object of this work is to so present the scientific data concerning animal foods that the average stockman can make rational use of them.

The subject of scientific breeding is of vast importance in all forms of animal husbandry. All the average stockman needs is a clear conception of the type desired to be produced and an adaptation of means to that end. It is possible for him to get a clear conception of this when the results of experience are presented in a practical way.

The care of animals in ways other than feeding is also of great importance. It is estimated on good authority that in five states of the middle west during a ten-year period the average loss per farm was: 5 horses, 16 cattle, 19 sheep and 64 hogs. The Government statistics show that \$200,000,000 worth of live stock was lost from disease and exposure in the United States during the year 1915. This immense loss was due largely to preventable diseases and to improper care. In the department on diseases in this book is presented to the stockman the practical, simple methods in use among the most successful, efficient stock raisers of the country. If these are put into practice, they will help greatly in saving a large percent of the immense loss that the farmers are now sustaining. Every farmer should know how to care for the simpler difficulties.

It is not the aim of the author or compilers to substitute suggestions for the services of a veterinarian in any locality. It is too well recognized that a lack of care and attention to stock is in a large way responsible for the development of many diseases that need the attention of a veterinarian. In the section devoted to the diseases of stock, we merely aim to give suggestions that can be utilized in warding off many diseases of the simpler character and suggesting how the stockman may aid the local veterinarian where greater knowledge is needed. A farmer understands his stock better than anyone else, and can always give valuable aid in explaining the conditions which preceded the calling of the veterinarian, so that a proper analysis or diagnosis of the case may be had.

We wish to acknowledge our indebtedness to "Klemheinz, Sheep Management," for the illustrations on "Docking the Lamb" and "Drenching the Sheep"; Fuller, Wisconsin College of Agriculture, for the illustration of the "A-Shaped Colony House for Hogs"; Craig, "Judging Live Stock," for the illustration showing the "Horse's Mouth."

If the book accomplishes, even in a small way, the purpose for which it was written, it will prove a very valuable source of information for the farmer and stock raiser.

THE AUTHOR.

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LIVE STOCK BREEDING AND MANAGEMENT

The Importance of Farm Animals.—The extent to which farm animals furnish food, clothing and labor, is perhaps sufficient to emphasize their importance. A long list of useful articles manufactured from their hides, hair, bone and other parts of the animal body give further evidence of how farm animals contribute to the welfare of the human race. Moreover, live stock production is the basis of most practical and profitable agriculture. Farmers have much to encourage them in the production of live stock where they understand its care and management. Well organized herds and flocks provide:

A profitable cash income from animals and animal products.

A home market and profitable prices for farm crops.

A means of keeping up the fertility of land and a maximum production of crops.

Cash returns for farm residues and by-products that have no general market value.

A utilization of farm labor in a manner to make it profitable throughout the year.

How to Make Live Stock Pay.—There is evidence of serious misfortune or mismanagement when live stock on the farm does not pay. Misfortune and mismanagement resulting in serious losses are largely overcome and success in making live stock pay is assured by acquiring a knowledge of types and breeds of animals most useful in serving their purpose, and practicing a system of selection, breeding and management that has proved most successful in the production of farm animals. It pays to read the best live stock books and literature, to make the acquaintance of successful stockmen and learn of their methods of production, to practice consistently and persistently the best methods of breeding and feeding and to raise the standard of one's herds and flocks by selecting and keeping at all times the best animals one can secure.

The Necessity for Types and Breeds.—Differences in size, character of body and the purposes which animals best serve, make the differences in types and breeds. The type of an animal indicates its utility and is important for this reason. There may be several breeds representing a given type. Breed is important in that it represents a class of animals that reproduce themselves and their good qualities with a greater degree of likeness and certainty than do animals of no particular breed.

The types and breeds of animals maintained on a given farm are a reflection of the mind and the management of the farmer responsible for their production. Improved breeds of farm animals are the result of many generations of constant effort on the part of men who have had in mind types of animals best adapted for serving a given purpose. The true stockman endeavors to select and breed animals in a manner to preserve types that have been established. Mismanagement resulting in mixing breeds, and failure to properly feed and care

for animals, lowers the standard of live stock production and makes results uncertain and disappointing. Natural laws that govern and control the reproduction of plant and animal life and which generally group plants and animals under district varieties, emphasizes the importance of selecting recognized types and breeds of farm animals.

The Best Breed to Select.—Many factors enter into the selection of a breed. Personal preference or no preference whatever accounts for the character of many farm animals. The farm organization, its adaptability for producing a given class of farm and animal products, its relationship to markets and local manufacturing plants like creameries, cheese factories, condenseries and abattoirs, should be leading factors in deciding upon a breed. There are many advantages in buying and selling and in breeding and managing animals where a community agrees upon a given breed and co-operates in an effort to promote the breed. A lifetime is too short to accomplish all that one would like to do in developing a given breed. Therefore, one's choice in the matter of selecting and breeding should be carefully considered. A man is most fortunate when he can choose the breed that his father, and his grandfather developed and adapted to a given farm.

Definitions Applying to Animal Breeding.—Breeding as it applies to live stock is the art of reproducing and improving farm animals. Its prime object is the improvement of animals for meat, milk, wool and labor.

Promiscuous Breeding.—Mating animals without reference to type, breed or individuality, most often results in undesirable farm animals and should be discouraged.

Cross-Breeding.—This system of breeding refers to mating animals of two distinct breeds. It offers the advantage of increasing the size, vigor and productive quality of animals. These good results, however, are confined to only the first generation of animals. Cross-bred animals are not satisfactory for breeding purposes except where one desires to establish new breeds and types. The practice, therefore, tends to destroy the opportunity for preserving established breed type and character and the work of generations of time consumed in the development and perfection of given breeds.

Natural Breeding.—Mating animals not related but corresponding in type and breed, constitutes natural breeding. Where one has opportunity to use the best of sires this system of breeding is capable of producing very satisfactory results and may be regarded safer than breeding animals more or less closely related. It is the approved system of breeding most generally employed.

Line Breeding.—Mating animals within a given family, related to the extent of twenty-five percent and less than fifty percent of the same blood, is termed "line breeding." It is practically safe to practice line breeding where one does not allow the relationship to become too close and is careful to maintain definite standards relating to size and vigor. Line breeding tends to insure more uniform results than natural breeding.

Inbreeding.—Mating animals that are related to the extent of having 50 percent or more of the same blood, is inbreeding. When practiced by men who understand the nature and results of such breeding, it is a safe practice.

There are many inbred animals which have become much noted for their excellence in quality, prepotency and production. There are also many sad disappointments that have been experienced. Over-refined, under size, non-breeding, malformed and idiotic animals are evil results which may accompany too close breeding. Inbreeding tends to intensify both good and bad characters and it is a safe rule never to inbreed when defects and characters that are not desirable appear in the makeup of the animals to be mated. One must be prepared to rigidly select or cull from the herd the undesirable types that follow this practice.

Out-Crossing.—Inbreeding and line breeding confine animals to one family or strain. When there is a tendency on the part of a herd thus developed to show indications of weakness, it is well to select from some other strain or family of the same breed, a sire that will overcome the weakness and instill into the family the character that is lacking. Such a practice is termed "out-crossing."

Grade and High Grade Animals.—A grade animal is usually by a pure bred sire and out of a grade or native female. It, therefore, has 50 or more percent of the blood of a pure bred class of animals. A high grade animal carries a relatively high percent of the blood of a pure bred. Grade animals are not eligible to registry in the herd books that record the names of pure bred animals.

Pure Bred Animals.—The term "pure bred" applies to animals having one hundred percent of the blood of a distinct breed. They are usually from registered animals and are eligible to registration in the herd books of the Association that promotes and preserves the records of animals of the breed in question.

Cross-Bred Animals.—Technically a cross-bred animal is the progeny resulting from the mating of pure bred animals of two distinct breeds. The type may be the same or different, for example, two breeds of cattle like the Shorthorn and Aberdeen Angus, or breeds representing beef and dairy cattle like the Shorthorn and Guernsey.

Mongrel and Scrub Animals.—Where animals have been promiscuously produced by more or less crossing or inbreeding and have been poorly managed or neglected, they are commonly known and termed mongrels or scrubs. They may represent a survival of the fittest, but at best are unprofitable and a poor foundation upon which to build for anything better. Time and money will be gained by selling such animals and purchasing grades or pure bred to serve as a foundation for breeding.

Factors that Insure Success in Animal Breeding.—Select the best foundation animals it is possible to secure, keeping in mind animals of the most useful and desirable types.

Use only sires of pure breeding and as far as possible sires old enough to have proved their prepotency.

Feed and manage the breeding stock to keep them in a healthy and thrifty condition.

Avoid unsanitary conditions and all possibility of introducing contagious and infectious diseases.

Keep young animals growing from birth to maturity.

Continue a line of breeding from year to year that leads to a definite standard.

Bear in mind that the best results in breeding animals require several years of faithful work.

Endeavor to gradually grow into something better from year to year until that which is most excellent is secured.

Breeders of Live Stock Classified.—Men engaged in the breeding of improved live stock do not all rank alike. The following classification may be made:

Farmers who engage in general farming and maintain and breed grade or high grade animals which best serve the general market demands.

Farmers and professional stockmen who make a specialty of breeding pure bred animals that serve primarily for breeding purposes.

One's experience, knowledge and opportunity for successfully engaging in the breeding of pure bred live stock are factors that should determine in which class he should enter as a breeder of live stock.

Advantages in Breeding Grade Animals.—The breeding of grade and high grade animals offers the following advantages:

One gains a knowledge and an experience necessary in successfully breeding any class of farm animals without incurring the danger of serious financial loss.

It costs much less to start and to continue the business.

One is not obliged to spend time and money to find special markets for animals.

Excellent individual animals and uniform herds may be produced.

Advantages in Breeding Pure Bred Animals.—Excellent pure bred animals tend to reproduce themselves and their good qualities with a greater degree of certainty than do grade animals.

Prices paid for pure bred animals that serve for breeding purposes are much higher than prices paid for grades.

There is a satisfaction in producing the best and also in attaining a reputation as a stockman and in doing the most for the improvement of live stock that is worth while.

Wherein Breeding Pure Bred Live Stock is More Expensive.—There is considerable more expense in breeding pure bred live stock that must be anticipated by one who chooses to engage in breeding such animals. One should also take this fact into consideration in buying pure bred sires and other pure bred foundation stock. The items incurring greater expense are as follows:

The purchase price of breeding stock.

The cost of breeding and maintaining animals in a manner to meet the market demands.

The cost of registering animals and transferring their ownership in the herd books of the association representing their breed.

The cost of advertising and marketing surplus stock sold for breeding purposes.

The expenses incident to keeping in touch with affairs and making the acquaintance of men prominent in directing the welfare of the breed in question.

Knowledge and Skill Required to Breed Pure Bred Live Stock.—The breeder of pure bred live stock must seek to acquire more knowledge and skill than is required by the farmer who breeds only grade live stock. Such knowledge and skill pertains to the following:

Laws and fundamental principles of breeding, feeding and management that tend to insure the greatest success.

The characteristics, individuality and lines of breeding that produce the best results.

The rules and regulations pertaining to registration, transportation and management of animals sold for breeding purposes.

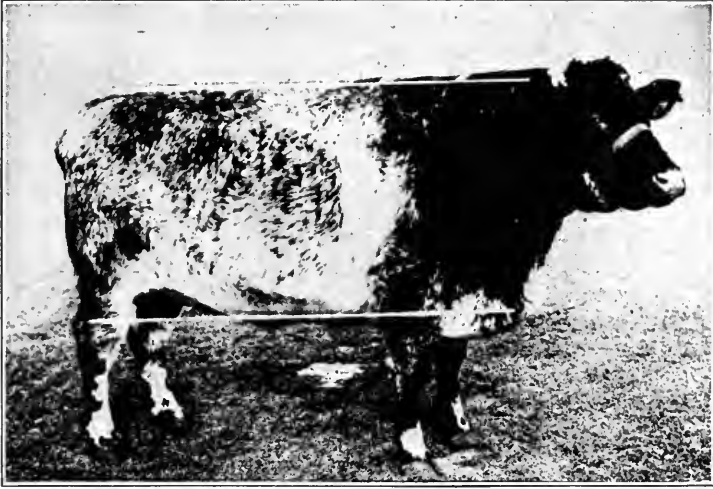
The true value of animals and prices commonly paid for animals of a given line of breeding and individuality in order that prices may be fair both to the seller and buyer.

The value and means of advertising and doing business in a manner to command the respect and to secure the orders of men seeking animals for breeding purposes.

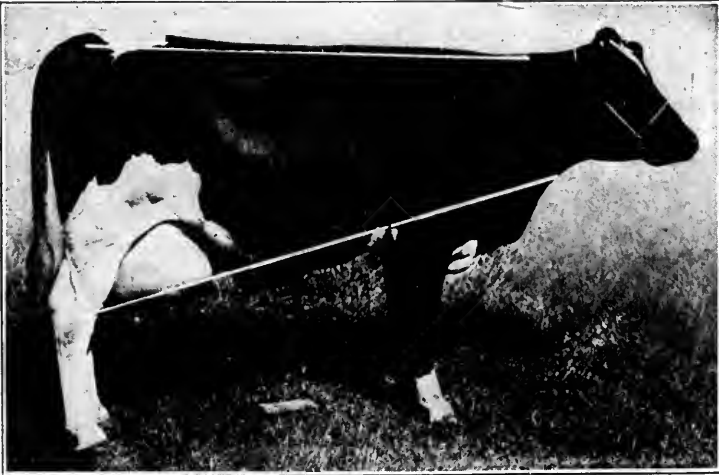
The Live Stock Breeder's Calling.—The live stock breeder, whether engaged in the production of grade or pure bred animals, should consider his occupation as one of high and dignified calling. He is in closest touch with the work of Nature and cannot hope to succeed without being true to her laws and principles and to himself and his fellow beings. The breeding and selling of pure bred, registered live stock has been built and rests solely on honor. Men who do not have faith in their fellowmen cannot regard pure bred more valuable than grades of equal individuality. Pure bred animals of excellent individuality and of families excelling in type and production and preserved and reproduced by men of honor, will always be the most reliable for breeding purposes and command the highest prices paid for any class of animals.

CATTLE PRODUCTION

The production and maintenance of cattle play an important part in Agriculture. There are several lines of cattle production that offer good opportunities for utilizing land and feed in a manner to insure profitable incomes and to keep up soil fertility. These lines of production may be enumerated as follows:



Beef (Shorthorn).



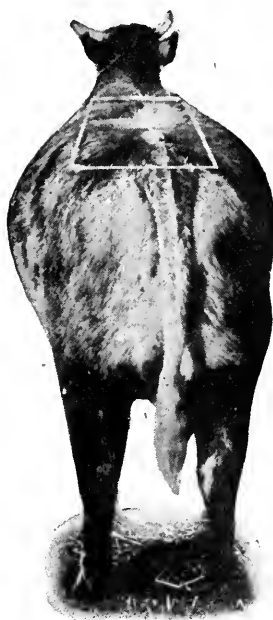
Dairy (Holstein).
Distinct Types of Cattle.



Beef (Shorthorn).



Dairy (Holstein).



Beef (Shorthorn).



Dairy (Guernsey).

Distinct Types of Cattle.

Breeding and maintaining cattle primarily for milk production.

Breeding and growing cattle for stockers and feeders.

Grazing cattle on ranches of the West or large areas of farm land.

Fattening cattle in feed lots where corn and fattening feeds are available in sufficiently large quantities at reasonable prices.

Producing pure bred cattle to serve primarily for breeding purposes.

Types of Cattle.—There are two distinct types of improved cattle, namely dairy and beef. Cattle of dairy type excel in the production of milk and utilize feed very largely for milk production. Good dairy cows will produce milk at the expense of body weight which weight they regain only when the milk flow is reduced and they are dried off. They are, therefore, comparatively thin and light in form.

Cattle of the beef type excel in the production of beef and in many instances do not give milk enough to pay the cost of milking them. In such instances the calves are allowed to run with their mothers until they are naturally weaned. Beef cattle consume large quantities of feed and utilize it for beef rather than for the production of milk.



General Purpose Cow (Red Polled).

General Purpose Type.—Many cattle do not conform distinctly to either of the two respective types of highly specialized cattle and for this reason and the fact that they serve in producing a fair amount of both milk and beef, have been termed cattle of general, or dual-purpose type. Theoretically, an animal might be expected to excel in both beef and milk and thus be most ideal. In practice, however, general purpose cattle excel in the product that is given most emphasis. It is unreasonable to suppose that animals could excel for a given number of generations in milk production and at the same time retain excellent beef forms. Beef cattle require liberal quantities of feed to maintain the amount of beef they are capable of producing and their milk production is cut short to the extent that they utilize feed for beef production.

It should be understood that any specific type of animal is determined by the disposition or temperament that governs the use it makes of the feed eaten. The beef and the dairy animal when put side by side are both capable of consuming equivalent amounts of feed, granting that they have equal feeding capacities, but under normal conditions there will be a marked difference in the amount of milk and beef produced by them in a given year. The one will excel in beef production and the other in the production of milk.

In aiming to keep cattle of general purpose type, it is regarded best to select large, roomy cattle which have natural tendencies to produce milk in liberal quantities during the early stages of their lactation and which have a covering and quality of flesh indicating that they will produce offspring reasonably satisfactory for beef. As soon as one feels the necessity of emphasizing beef or dairy quality in his cattle, it will be best for him to choose a specialized type and breed best adapted for serving his purpose.

Breeds of Cattle.—The development of the respective breeds of cattle dates back to the latter part of the eighteenth century and began for the most part in the British Isles. Limited space does not permit herewith of more than a tabulated statement of the various breeds and their distinguishing characteristics. Material giving a more complete description and account of the breeds will be interesting and helpful. Secretaries of the National Breed Associations in most instances are in a position to furnish material pertaining to the breed represented. However the above is sufficient for all practical purposes.

TYPES AND BREEDS OF CATTLE

Type	Breed	Nativity	Weight	Average per cent Fat in Milk	Color and Characteristics
Dairy of the five more prominent Breeds.....	Ayrshire	Scotland, County of Ayr	1500-1700 1000-1100	3.84	White with red, black or mahogany spots. Red may predominate. Horns long, inclining upward and outward. Body well rounded and rather heavy in hind quarters. Udder well attached and uniform symmetrical. Teats sometimes short. A hardy, rustling breed.
	Brown Swiss	Switzerland	1600-1900 1200-1400	3.78	Dark to light brown or gray. Light color about nose along back and on udder. A hardy breed with comparatively heavy bone and flesh. Some strains beefy, due to dairy purpose qualities encouraged prior to 1907.
	Guernsey	Guernsey, Island of English Channel Group	1500-1700 1000-1100	4.77	Yellow or reddish fawn with white markings. Utility more than showy and type given special attention in development of breed. Milk of rich and yellow color.
	Holstein-Friesian	Holland- Province of Friesland	1900-2000 1200-1500	3.28	Black and white. Either color may predominate. Largest of dairy breeds, when well raised. Excellent in quantity of milk. Capacity for large consumption of roughage makes milk production economical where pasture is abundant.

TYPES AND BREEDS OF CATTLE (Continued.)

Type	Breed	Nativity	Weight	Average per cent Fat in Milk	Color and Characteristics
Dairy of the five more prominent Breeds	Jersey	Jersey Island of English Channel Group	1200-1500 700-1000	4.98	Fawn of light to dark shade. White spots sometimes present. Smallest of five breeds most commonly found on dairy farms. American bred cattle larger than imported cattle. Cattle excel in quality and in the economical production of rich milk. Some families polled.
	Dutch Belted	Holland	1200-1600	3.40	Black with white band about the body. Attention to perfecting the color marking in the early history of the breed resulted in neglect of other qualities that were more important to milk production.
Dairy of the less prominent Breeds.	French Canadian	Canada, Province of Quebec	800-1000 700-800	3.99	Solid black or black with shade of yellow fawn, brindle or brown with black points. A very hardy breed well adapted to scant and hilly pastures.
	Kerry	Ireland, Kerry Mountains	800-1000 500-600	4.36	Black, sometimes red. The "true Kerry" is known in Ireland as the "poor man's cow" and excels in milk production. The Dexter Kerry is more blocky and beefy, and may be black, red or roan.
Beef.	Aberdeen-Angus	Scotland, County of Aberdeen	2200-2800 1400-1800	4.99	Black, in rare instances red. Some white on udder or navel, not objectionable. Head polled. Very smooth and evenly fleshed body. Popular in the feed lot and on the market as beef cattle.
	Galloway	Scotland, Counties of Warton and Kirkcudbright	1800-1900 1200-1300	High	Black. A reddish or brownish tinge sometimes present. Hair long and shaggy, making hides very popular for robes and coats. Head polled. Breed very hardy.
	Hereford	England, County of Hereford	2200-2800 1400-1800	Good	Red, with white face, switch and underline. Horns, long and spreading. Hair more or less curly. Breed very popular on the range and for grazing purposes. Excellent for beef production.
Beef.	Shorthorn	England, Counties of York, Durham and Northumberland	1800-2200 1200-1600	3.73	Red, roan, white, red and white, a most popular and cosmopolitan breed, embracing several strains of beef cattle and some strains that possess deep milking qualities. Because of the crossing of the various strains, considerable variation in type is noticeable in herds where careful selection has been neglected.
	Polled Durham				Same as Shorthorn, except for the polled condition of the head—are practically beef Shorthorns.
General Purpose..	Devon	England, Counties of Devon and Somerset	1500-2100 1300-1500	4.90	Bright red. White not permissible except on udder of cow or on underline of body. Three hundred lbs. butter produced in a year by mature cows. Small boned, moderate oil, and fine grain of meat make carcasses popular with butchers.
	Red Polled	England, Counties of Norfolk and Suffolk	1800-2200 1100-1600	3.73	Red with white switch. White on underside of body permissible. Certain families of breed produce milk and butter fat in quantities that compare favorably with dairy breeds. Other strains excel in beef production to the extent that milking qualities are impaired.
	Dairy Shorthorn	Same as for Shorthorns	1800-2000 1100-1400	....	Dairy Shorthorns are the result of strains of Shorthorn cattle that have been developed more especially for milk production as well as a moderate beef production.



WILLIAM DEMPSTER HOARD
Fort Atkinson, Wis.

The World's Foremost Dairy Exponent, Editor of Hoard's Dairyman, Practical Dairy Farmer, Ex-Governor of Wisconsin.

A man of keen and farsighted intellect, who has expounded and demonstrated the value of the dairy cow as a profitable farm animal and an economic producer of human food.

DAIRY CATTLE PRODUCTION AND MANAGEMENT.

Dairying as an Industry.—Dairy cattle and milk production is an industry in itself. The importance of milk and its by-products in supplying food for the human race has resulted in much attention being given throughout the entire country to breeding and maintaining herds of dairy cattle. The production and distribution of dairy products, engages the attention of many organizations, both of a local and a national character. Under suitable conditions dairying, though accompanied by considerable expense and labor, is highly profitable. The dairy cow utilizes farm grown crops for milk production economically, and gives the farmer a return at regular and frequent intervals. Dairy farming requires, however, an intelligent consideration of many details pertaining to the selection, care and management of the herd and providing conditions that insure milk products being handled in a manner to conform with standards that regulate it as a food product. The dairy cow has no competitor in producing milk in large quantities for commercial purposes, and with the increase in population there is every encouragement for the farmer who intelligently engages in the business of dairying.

Cows of Dairy Type and Breeds Essential for Success.—Choosing cows of dairy breed and type is fundamental to successful dairying. The development of dairy breeds has been the result of high ideals and systematic effort on the part of many generations of dairy men who realize the possibilities in a type of cattle especially adapted for large and economical productions of milk and butter fat. Cattle that are true representatives of the breeds generally recognized as most suitable for dairy purposes, are a very distinct type from the ordinary native cattle and cattle of the improved beef type. The distinct breeds of dairy cattle tend to reproduce themselves from generation to generation with a marked degree of uniformity and in this fact lies the importance of choosing high grade or pure bred dairy cattle for dairy purposes.

Characteristics of Dairy Cattle.—Cattle of dairy type conform to the following peculiarities and characteristics which enable them to produce large and economical yields of milk:

Medium to large size of body for the breed.

Large feed capacity, as indicated by a roomy and capacious abdominal cavity, a large mouth and sufficient strength of body to consume and utilize a large quantity of feed.

Dairy temperament or a disposition to convert the large portion of feed consumed into milk rather than body flesh. It is indicated by the absence of surplus flesh and a comparatively lean and refined appearance of the entire body.

An udder that is large, carried well up to the body, evenly and normally developed in all quarters and of good quality.

A strong, healthy flow of blood to all parts of the body, giving vigor, alertness and constitution. These characteristics are indicated by prominent facial, udder and mammary veins, abundant secretions in the ears, skin of the body and at the end of the tail and a coat of fine, straight hair.

Establishing a Dairy Herd.—The surplus of dairy cattle in sections where dairying is the principal agricultural industry, offers an opportunity for the purchase of cattle suitable for establishing and maintaining dairy herds. Time is too short to depend upon any other means of laying the foundation. In many instances dairymen depend largely upon purchasing cows for the maintenance of their herds. This system has the advantage of keeping the herd filled with cows of mature age and capable of producing large and profitable quantities of milk.



Dairy type and characteristics prominently developed.

ties of milk, if the dairyman is an expert cow buyer and can locate and secure at reasonable prices such cows as it will be necessary for him to purchase.

Disadvantages in Buying Cows.—Buying cows has the following disadvantages:

It is difficult to locate and induce men to part with their best cows.

To secure the most suitable cows one must pay high prices.

The expense of locating and transporting purchased cows is considerable.

Subjecting cows to new and strange environment has a tendency to lower their productive capacity for at least a year.

One increases the danger of introducing disease into his herd and every precaution has to be exercised.

Raise Heifer Calves to Maintain the Dairy Herd.—The best way to maintain a most profitable dairy herd is to raise heifer calves.

It will cost less to raise heifers than it will to buy cows.

The home raised heifers generally develop into better and more profitable cows than most of those which can be purchased.

Raising the dairy herd lessens the danger from contagious abortion, tuberculosis and other infectious diseases.

A comparatively young herd may be kept from which surplus animals can be sold at profitable prices.

Good dairy calves are secured from the best cows of the herd mated to good, pure bred dairy sires. A calf must be well born as well as properly raised to become the right kind of a dairy cow. Too much emphasis cannot be laid upon cows of good type and production capacity and sires that are of the best type and breeding. Knowing the best cows in the herd and being particular to save and raise well their heifer calves is the best way to get a profit-producing dairy herd.

Judging Dairy Cows.—The most successful dairyman is a good judge of dairy cattle. The ability to select profitable from unprofitable cows has always been a strong factor in successful dairying and in the future it will be even more necessary for men who engage in dairying to become good judges of dairy cows.

Although the consumption of milk and milk products is constantly increasing and the demand for bred-for-milk-and-butter-fat-production-cattle growing, the cost of feed and labor and the price of land is also rapidly increasing thus making it all the more necessary for the farmer to have better cows. It is becoming more and more important for him to know the family history of the cow, whether her ancestors were pure bred or grade and whether they were exceptional milkers or just ordinary or even poor producers.

The farmer who is a good judge of dairy cattle gains many advantages:

Makes fewer mistakes in buying cattle.

Gets better prices for his surplus stock.

Selects and builds up a herd of cows of uniform size, type, breed and quality.

Receives a higher and more uniform production of milk and butter fat.

Makes greater returns over and above the cost of feed and care.

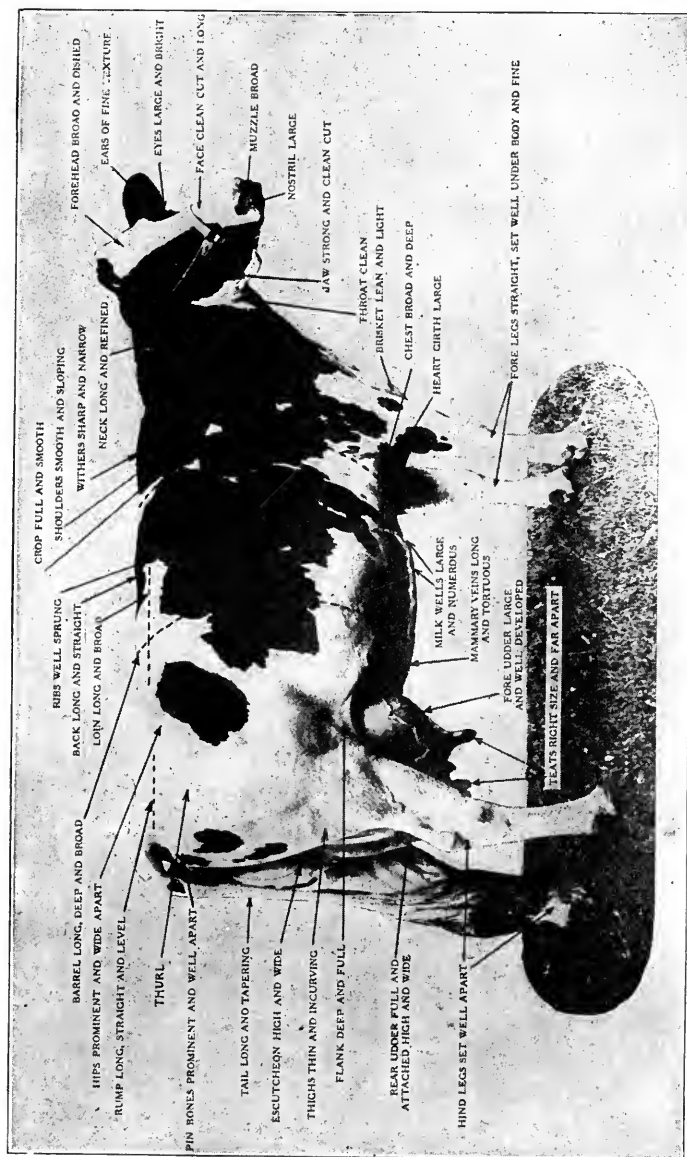
Uses better sires and secures better calves.

Has better success in feeding and showing cattle at fairs and expositions.

Has greater satisfaction and pleasure in owning and managing a dairy herd.

Profit-Producing Cows.—A ready acquaintance with the qualifications for dairy type previously named, as well as with the line of breeding represented, will aid the dairyman in selecting profit-producing cows. It, of course, should be admitted that even the most expert judges of dairy cattle are unable, by relying solely upon the appearance to the eye and a study of family records, to foretell a cow's ability to produce milk and butter fat. That, in the end, is only told by the use of the milk scales and the Babcock tester.

Experiments and experience have shown clearly that as a rule, cows which possess certain so-called dairy characteristics are more economical producers of



THE PARTS OF A DAIRY COW.

A dairy cow should have large capacity for feed, a dairy temperament, well developed milk organs, fine quality, perfect health, and be capable of a large production of milk and butter fat. Dutchess Skylark Ormsby, the champion cow for yearly butter fat production, record 27,761.7 pounds milk, 1205.09 pounds butter fat, shows excellence in all parts.

SCORE CARD FOR DAIRY CATTLE.

GENERAL APPEARANCE—A dairy cow should weigh not less than 800 pounds, have large capacity for feed, a dairy temperament, well-developed milk organs, fine quality and perfect health, and be capable of a large production of milk and butter fat.

SCALE OF POINTS	Per- fect score	Points Deficient		Points Deficient	
		Student's score	Cor- rected	Student's score	Cor- rected
INDICATION OF CAPACITY FOR FEED— 25 POINTS					
Face, broad between the eyes and long; muzzle, clean cut; mouth, large; lips, strong; lower jaws lean and sinewy.....	5	.....	.....	.....	.....
Body, wedge shape as viewed from front, side and top; ribs, long, far apart and well sprung; breast full and wide; flanks, deep and full....	10	.....	.....	.....	.....
Back, straight; chine, broad and open; loin, broad and roomy.....	5	.....	.....	.....	.....
Hips and Thurls, wide apart and high.....	5	.....	.....	.....	.....
INDICATION OF DAIRY TEMPERAMENT— 25 POINTS					
Head, clean cut and fine in contour; eyes, prominent, full and bright.....	3	.....	.....	.....	.....
Neck, thin, long, neatly joined to head and shoulders and free from throatiness and dewlap.....	4	.....	.....	.....	.....
Brisket, lean and light.....	2	.....	.....	.....	.....
Shoulders, lean, sloping, nicely laid up to body; points prominent; withers sharp.....	4	.....	.....	.....	.....
Back, strong, prominent to tail head and open jointed.....	3	.....	.....	.....	.....
Hips, prominent, sharp and level with back....	3	.....	.....	.....	.....
Thighs, thin and incurving.....	4	.....	.....	.....	.....
Tail, fine and tapering.....	1	.....	.....	.....	.....
Legs, straight; shank fine.....	1	.....	.....	.....	.....
INDICATION OF WELL DEVELOPED MILK ORGANS—25 POINTS					
Rump, long, wide and level; pelvis, roomy....	3	.....	.....	.....	.....
Thighs, wide apart; twist, high and open.....	3	.....	.....	.....	.....
Udder, large, pliable, extending well forward and high up behind; quarters, full, symmetrical, evenly joined and well held up to body.....	15	.....	.....	.....	.....
Teats, plumb, good size, symmetrical and well placed.....	4	.....	.....	.....	.....
INDICATIONS OF STRONG CIRCULATORY SYSTEM, HEALTH, VIGOR AND MILK FLOW—25 POINTS					
Eyes, bright and placid.....	2	.....	.....	.....	.....
Nostrils, large and open.....	3	.....	.....	.....	.....
Chest, roomy.....	5	.....	.....	.....	.....
Skin, pliable; hair, fine and straight; secretions abundant in ear, on body and at end of tail..	7	.....	.....	.....	.....
Veins, prominent on face and udder; mammary veins, large, long, crooked and branching; milk wells, large and numerous.....	7	.....	.....	.....	.....
Escutcheon, wide and extending high up.....	1	.....	.....	.....	.....
Total.....	100	.....	.....	.....	.....

(Score card used at Wisconsin College of Agriculture.)

milk and butter fat than those which lack these features. It is then important for the farmer who keeps cows for the milk and butter fat they yield, to see that as far as possible his animals have the qualifications for dairy type.

Cows usually fail in the production of milk to the extent that they fail in one or more of these essential features. Each part of the body bears some relationship to one or more of these essential features and enables one to judge of its prominence and desirability. Where one is able to consider all parts of the body and judge these essential features, he is not likely to err seriously in his judgment.

Cows Need Room for Digestive Organs.—A large body, more especially the barrel, in proportion to the size of the animal, indicates capacity. The body of the dairy cow should be wedge shaped as viewed from either the front or the side or the top of the withers. It should be wider at the hip points than at the withers. The floor of the chest between the forelegs should also be wider than the top of the withers. Again, the body should be deeper from the hip points to the bottom of the udder than it is at the fore quarters.

These characteristics of the body have led to the term "triple wedge shape conformation," and in giving consideration to the digestive capacity of the cow it should be remembered that it is the base ends of the three wedges rather than the sharp ends that indicate feed capacity.

Ribs that are well sprung and far apart, an open chine, a back that is wide over the loins, a large barrel, hips that are wide apart, rear flanks that are full and great depth from hips to lower line of the flank, all combine to indicate a large digestive capacity. A wide forehead, a comparatively long face, broad muzzle, good sized mouth and strong, sinewy jaws, are also considered indications of a large digestive capacity.

The tail is often measured in judging a cow and to meet the standard requirement should reach to, or below, the hocks and carry a good switch. This renders it most useful in brushing flies which is its chief purpose. Excepting as the loose joints of the tail show an open condition of the vertebrae of the back, which is undesirable in the dairy cow, it is difficult to understand how the tail would indicate production.

Dairy Temperament and Milk Production.—The dairy temperament or dairy disposition of a cow indicates her ability to convert feed into milk rather than into flesh. It is a feature which the dairy breeds have acquired through the process of selection and breeding for milk and butter fat production. It varies in its degree of strength, even among pure-bred animals, and, therefore, needs to be carefully considered in judging. A cow that is a large and economical producer of milk and butter fat is almost certain to have a highly developed dairy temperament.

Cows excelling in dairy temperament show the following characteristics:

Features about the head and face are clean cut in outline and indicative of fine quality; eyes are prominent, bright and active; neck is fine, clean, neatly joined to the head, not too full at the throat and comparatively long and thin; shoulders are oblique, comparatively bare of flesh and sharp at the withers; the backbone, hips and pin bones are prominent and sharp; ribs are more or less prominent and

open; thighs are thin and incurving, sometimes termed "cat hams;" and bones in all parts of the body indicate quality rather than coarseness.

Sharp Wedges Indicate Temperament.—The lean, muscular tissue on the outside and underneath the shoulder blades and along the back accounts for the comparatively sharp conditions of the withers. The wedge-shaped conformation of the body is largely due to the absence of flesh about the neck and the fore quarters. It may be said, therefore, that the sharp end of the triple wedge-shaped conformation is indicative of dairy temperament.

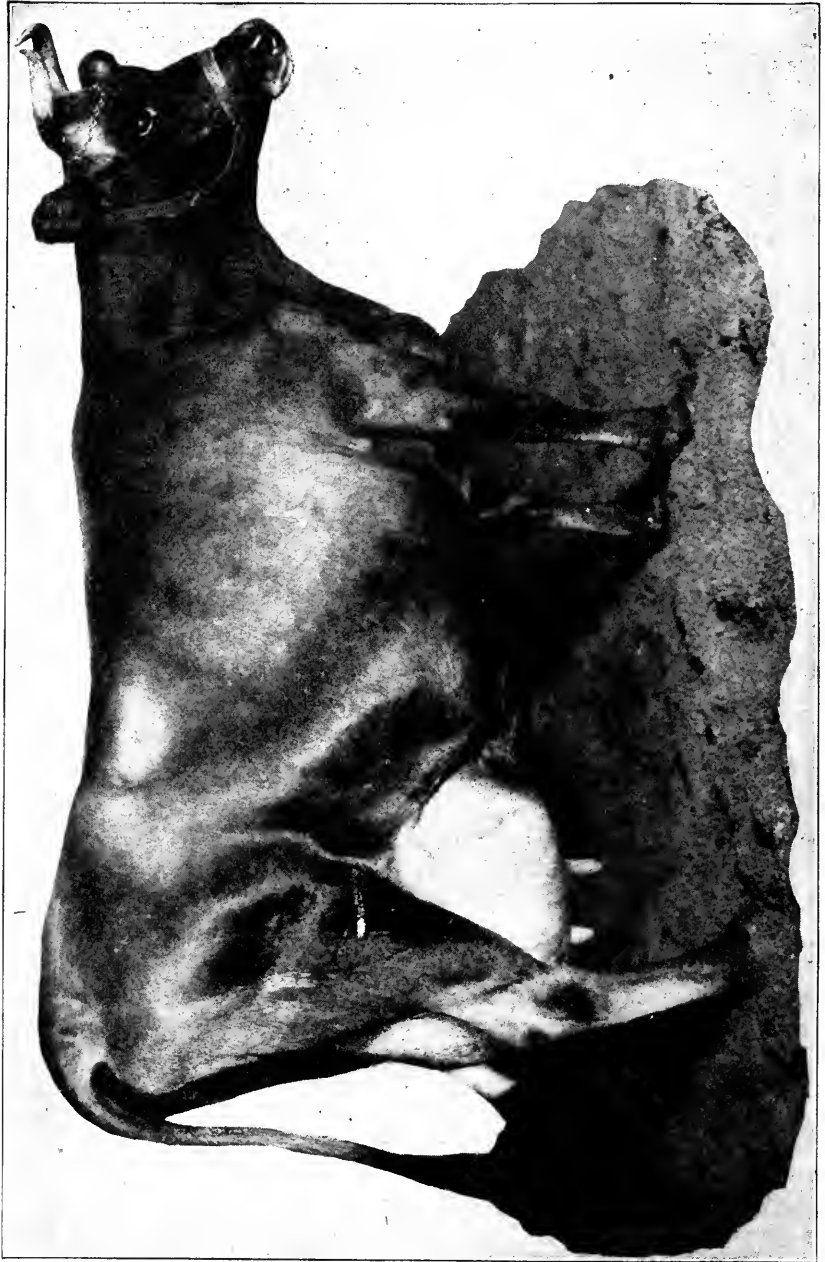
In judging quality and condition of the muscular tissue of the body, consideration should be allowed for the size, age and stage of lactation of the animal. It should also be borne in mind that the bones and muscular tissues in a large cow are naturally heavier than in a smaller or younger animal. Then, too, there is not the natural refinement and spareness of form in the larger breeds that there is in the smaller ones. Marked coarseness, however, in any animal is undesirable and is usually accompanied by a sluggish disposition that in the case of the dairy cow prevents her from "performing at the pail" satisfactorily. Young heifers with their first calves usually carry more flesh than cows of mature form. All cows that are properly fed usually show a higher condition of flesh development toward the close of their lactation and prior to freshening than they do when four or five months advanced in lactation. This should be taken into consideration in judging dairy temperament.

A Well Developed Udder.—The udder is the milk secreting organ and its proper development is, therefore, essential. Cows, even of large digestive capacity and of pure dairy breeding, fail to make satisfactory productions when they have poorly developed udders.

The udder consists of two large glands which are more or less distinctly divided to correspond with each of the four teats. The duct of each teat enters a small cavity termed the "milk reservoir." The milk reservoir of each quarter is more or less surrounded by lobes of glands held in position and closely together by connecting tissue. These lobes may be likened to thick bunches of grapes since each lobe has several divisions called lobules, corresponding to the grapes. The lobules are made of small divisions called "alveoli" which correspond to the seeds of grapes. These alveoli consist of small cells surrounded by a fine network of blood vessels and nerves. The milk is secreted by these cells.

The best cows of all breeds have comparatively large udders with equally developed quarters extending well forward underneath the body and a good distance up behind and between the thighs. Swinging or pendulous udders result from poor attachment. Irregularity in the development of the quarters is a criticism to be offered on many udders. The first consideration, however, should be size and quality. The gland tissue should be fine and plastic rather than fatty or coarse and hard.

Good Circulation of Blood Important.—Only when there is a thorough circulation of blood and all parts of the body are active in performing their respective functions, can the dairy cow be expected to yield a large flow of milk. When the cow is sick, or, by virtue of her poor individuality, is dull and sluggish, there



Marked feed capacity and udder development (Jersey).

is an inactivity of all the glands of the body, resulting in a dry, harsh condition of the skin, a staring coat and a low production of milk. The circulatory system includes the heart, lungs, arteries and veins. These organs, respectively, force, purify and carry blood to and from all parts of the body.

When the feed which the cow eats is digested and assimilated, the blood carries it to all parts of the body including the glands of the udder which are abundantly supplied with blood vessels. A large amount of blood circulating to the udder is important to milk secretion. The size of the mammary veins and the openings or "milk wells" at the ends of the veins on the underside of the body are the best indications of how much blood passes through the udder. These veins, often called "milk veins," do not carry milk, as some believe, but rather carry away blood from the udder. Blood sometimes becomes gorged in the veins and as a result of too small milk wells, the size of the veins is misjudged. The blood passes into the udder through arteries located deep on the inner side of the thighs.

The oily condition of the skin and the oily secretion noted in the ears and at the end of the tail, are indications of healthy circulation of blood to all parts of body and a general activity on the part of all healthy glands of the body, including those of the udder. The large, open nostrils, protruding ample air passages to the lungs for purification of the blood, are also important.

The escutcheon, which is outlined by a mark made by the difference in direction in which the hair runs at the rear of the thighs above the udder, was thought by a French student of the dairy cow, Guenon, to be associated with the artery that carries blood to the udder, and, therefore, indicative of the dairy quality of the cow. If this is true, it should be given as much importance as the milk veins. Guenon also regarded the peculiar condition of spots of hair noted at the back side of the udders of some cows and termed "the thigh ovals," as an important point to consider in connection with the escutcheon. A lack of positive knowledge, however, concerning the relation of these features to milk production does not warrant giving them as much consideration as is given to the milk veins. An escutcheon which is wide and extends high up on the quarters, is considered most desirable and usually is allowed one or two points on the score card for dairy breeds.

No Cow is Perfect.—No cow ever existed that could be called perfect in all respects when scored by a critical judge. It is expected that every animal will be more or less deficient and the eye of the judge should be quick to note the deficiency. In buying or selling, cows having deficiencies which tend to interfere seriously with their being economical producers should be discarded. Deficiencies in digestive capacity, dairy temperament, milk secretion and constitution should be given first consideration. Deficiencies in symmetry of form, breed characteristics and qualities which simply please the eye are more pardonable than those affecting production.

Some Common Deficiencies in Cows.—A deficiency in one part of the body is usually accompanied by deficiencies in other parts which one acquiring the art of judging should soon learn. An expert is able to judge the character of an animal quite accurately by taking careful note of the head. A long, narrow

head, for example, is usually accompanied by a long, narrow body. Good length of body is desirable in a dairy cow, but a narrow head usually has small eyes and nostrils and a small mouth.

A small, dull, listless eye expresses inability to do satisfactory work. Small nostrils indicate contracted lung capacity and poor constitution. A small mouth usually goes with small digestive capacity. Marked coarseness of bone, hide and hair are indicative of low producing capacity. Heavy, coarse bones over the tops of the shoulders, at the hip points, pin bones, in the tail and legs, are marks of poor dairy temperament.

A body which is short and lacking in depth due to close, short or straight ribs is objectionable because it detracts from the capacity for feed. The legs of an animal often appear long on account of a small body. The floor of the chest of a cow should be down to a point half way between the knee and elbow joints of the forelegs.

Deficiencies which are common to the hind quarters of the cow, include shortness and narrowness of rump, a drooping rump, narrowness between the thurls and pin bones and thickly fleshed thighs. Narrowness in the hind quarters, especially at the thurls and pin bones, is accompanied by thighs and hind legs which are too close together to permit proper development of the udder. A short rump and thick, heavy thighs are objectionable for the same reason.

There is practically always opportunity for criticising an udder on irregularity of quarters, handling quality, or attachment. An udder does not necessarily have to score perfectly to be capable of making a large production of milk, but it is desirable to have it large in proportion to the size of the cow and extend high up behind and well forward in front, with the quarters equally developed and of pliable handling quality. Teats which are too short, too close together or irregularly placed and inconvenient for milking, are often noted.

It is impossible to define perfection in the mammary veins, owing to the great variation in their development. Small, straight veins extending only a short distance forward from the udder and having very few, if any, branches, are characteristic of the veins on poor cows. A network of fair sized veins entering two or more wells on each side of the body, may be considered equal to larger and more prominent veins without branches and extensions.

Constitution and Breeding Essential.—A strong constitution is highly essential for the reason that the work of the cow is strenuous when she is fed for maximum production. A cow lacking vitality is rarely ever a good feeder, and consequently is unsatisfactory for milk production. The cow which has a constitution to enable her to be useful for a period of 10 or 12 years in making a large production of milk and regularly bearing offspring, is most profitable.

The breeding or ancestry of a cow largely determines her characteristics, the use she makes of her feed and the characteristics of her calves. The dairy cow, by virtue of her breeding, has the characteristics of some one of the recognized dairy breeds. Dairy breeding insures against disappointment when one buys or raises a cow for milk production.

Records of Production a Sure Test.—The cow is very much like a race horse when it comes to judging her ability to perform. Both the race horse and the cow must be judged by means of the eye assisted by the record of performance. The milk scale and the Babcock tester assisted by judgment of the eye, are the best means of exercising judgment in building up a profitable dairy herd. Persistently following this means of judging will lead to the establishment of a herd which is both pleasing to the eye and capable of a large and profitable production of milk and butter fat. Every dairyman can afford to weigh the milk from each cow at each milking and have a sample of the milk of each cow tested once a month. Results accurate enough for all practical purposes may thus be secured.

Milk Scale and Tester Increase Profits.—If judging by means of the milk scale and tester were employed on every dairy farm, feed worth millions of dollars, now being eaten by cows which do not pay their cost of keep, would be saved annually or converted into milk and the value of dairy products of the state would be greatly increased.

The Advanced Registry system, maintained by dairy cattle associations, records the milk and butter fat production of pure bred cows officially tested, and renders valuable aid in judging pure bred dairy animals on the basis of their ability to perform. A Cow Testing Association, which is usually a group of twenty-six farmers united to hire a man to weigh and test the milk and keep records of feed costs and milk production, is the best means for having entire herds of cows tested. It pays to belong to such an association. Only by eliminating the poorer cows of the herd can a high herd average be maintained. A breeder of dairy cattle who is particularly anxious to improve the quality and excellence of the herd will be careful to judge dairy cattle by means of the eye assisted by a careful consideration of milk and butter fat production. Furthermore, attention should be given to the pedigree of the animals.

A Good Family Tends to Insure Good Cows.—The pedigree of an animal is a record of its ancestors, or family. The ordinary pedigree usually shows the ancestors for five or six generations. The value of the pedigree lies in the fundamental law of nature that "like produces like." Where ancestors of a given animal are known to be good, one can judge more accurately than by the eye alone. The careful dairyman, who is anxious to build up the best possible herd, will find it profitable to study carefully the individuality, pedigree and performance of his cattle.

FEED AND CARE OF THE DAIRY COW.

Feeding Dairy Cows.—The prime object in dairying is to convert feed into milk and money. Healthy cows of dairy type and breeding and an abundance of feed suitable for dairy rations, are two equally important factors in milk production.

When prime grass pasture in abundance is available, good cows produce milk profitably and require very little of the dairyman's attention to the

matter of feeding. Many cows are unprofitable, however, for the reason that they have been underfed, improperly managed, or allowed to live an easy, unproductive life.

The following fundamental facts are important to consider in feeding dairy cows:

That cows are machines which convert feed into milk.

That each cow requires a maintenance ration whether milking or dry, and that feed additional to the maintenance ration is required for milk production.

That feed is the source of milk and that cows produce milk throughout the greater part of their lactation periods in proportion to the kinds and amounts of feed supplied. Cows which are heavy feeders are usually large and economical producers.

Practical Suggestions on Feeding and Management.—Dairy cows require careful attention at all seasons of the year if one hopes to secure the most profitable returns from them. In order to have conditions suitable for successfully feeding and keeping up a full flow of milk, the following practical suggestions are offered:

At All Times.—Treat cows gently and avoid excitement. The treatment cows receive in these respects has a marked effect on their production.

Follow a regular schedule of daily work, remembering that cows are creatures of habit.

Weigh the milk of each cow at each milking. The time spent doing so is well paid for by the increased interest and production it secures.

Regulate the amount of feed by the milk record and the individuality of each cow.

Allow free access to salt daily. Granulated or lump stock salt is most economical. Three-fourths of an ounce per 1,000 lbs. of live weight daily, plus six-tenths of an ounce for each 20 lbs. of milk, is regarded sufficient where salt must be mixed with the feed.

Give cows six to eight weeks rest between lactation periods. Feed them during the resting period in a manner to increase their weight and strength if they are in a rundown condition.

Discard the cow which has had a fair chance and failed at the end of the year to pay market prices for all the feed she has consumed. One cannot afford to feed and care for cows that do not pay expenses.

Belong to a dairy cattle breeders' association, a cow testing association and other organizations that will help to keep one posted and in touch with the best up-to-date methods of managing a dairy herd.

At Calving Time.—Have cows in good condition. It gives reserve energy for milk production.

Keep them in comfortable, clean box stalls, or a suitable place for calving.

Be prepared to treat an attack of milk fever, which may occur within the first forty-eight hours after calving in the case of cows that have passed their first lactation period.

Guard against cows becoming chilled immediately after calving by blanketing if necessary.

Do not milk heavily producing cows completely dry for a few days after freshening. It is not Nature's practice and has often been the means of producing milk fever.

Feed fresh cows sparingly the first few days after calving. Water with the chill removed, a few quarts of scalded bran or oats, and good hay, is sufficient for a cow the first day or two after calving. The condition of the cow should determine the manner in which she is fed following the first two or three days. It ordinarily requires two to three weeks to gradually work cows onto full feed. For best results one should be cautious not to over-feed or allow the cow at any time to get off feed or out of condition.

Remove the afterbirth if necessary inside of forty-eight hours after calving and do not allow it to be eaten.

In Winter Time.—Do not turn cows out to remain and suffer in cold or stormy weather. It prevents the right use of feed and reduces the milk production. Remember that cows do not have thick coverings of flesh like beef cattle to protect them from the cold.

Do not depend on frozen pasture for feed in late fall and the early winter. Cows that go off in milk production at this season are difficult to make profitable during the winter.

Keep cows in clean, comfortable, well lighted and properly ventilated stables. Pure, fresh air is as important as feed.

Brush cows daily. It pays better than grooming horses, which, as a rule, is not neglected.

Provide water two or three times daily which is not colder than that from a deep well. A tank heater is a profitable investment if necessary to warm water for cows.

Feed daily three pounds of corn silage or roots and one pound of clover or alfalfa hay for each 100 lbs. of live weight. These are approximate amounts and serve merely as a guide in feeding roughage to cows.

Feed cows 1 lb. of grain mixture for every 3 to 4 lbs. of milk produced. This will be equivalent to feeding about $\frac{7}{8}$ lbs. of grain for 1 lb. of butter fat produced. Cows producing milk with high per cent of butter fat should receive the larger amount of grain.

In Summer Time.—Do not try to save feed by turning to pasture too early in the season. It is bad for both cows and pasture.

Provide plenty of pure, fresh water, shade and protection against flies.

Supplement poor pastures with corn silage or green soiling crops like rye, oats and peas, green corn fodder, and other available feed. Keep up the production by feeding hay and grain if necessary.

A Winter Schedule for Dairy Barn Work.—Cows as well as people are to a very large extent creatures of habit, and regularity in all work pertaining

to management of the herd is most easily and successfully accomplished by following a definite schedule. Irregularity in feeding and milking times reduces the year's production of cows very materially. The following schedule for herd and barn work is offered as a suggestion:

Morning.

4:30—Feed grain.
 4:45—Milk cows.
 6:15—Feed silage.
 6:30—Feed hay.
 7:30—Water cows.
 7:45—Clean stables and bed cows.
 9:00—Groom cows.*

Afternoon.

3:00—Reclean stables.
 4:00—Water cows.
 4:15—Feed grain.*
 4:30—Milk cows.
 6:00—Feed silage.
 6:15—Feed hay.
 8:00—Water cows and arrange bedding.

Turn cows out each day for one-half to two hours, unless it is extremely cold or stormy.

*If barn is well ventilated and there is no difficulty from silage flavor in milk, the grain and silage may be fed together.

The Selection of Feeds for Dairy Rations.—Dairy rations ordinarily consist of a combination of concentrated feeds and roughages. Concentrated feeds include farm grains, by-products of grains and a mixture of feeds offered on the market as commercial feeding stuffs. Roughages include various kinds of hay, silage, soiling crops, roots, fodder and straw. Straw and the poorer grades of hay and fodder should be fed to dry stock and the better grades of roughages saved for cows that are fresh and capable of doing the best work.

Home-Made Grain Mixtures for Dairy Cows.—These mixtures are more satisfactory and, at normal prices, less expensive for milk production than feeding farm grown grains exclusively. Dairymen in every community should co-operate with their local feed dealers or feed agents to secure these feeding stuffs at the most reasonable prices.

No. 1.		Lbs.	No. 3.		Lbs.
Wheat bran	40		Corn and cob meal.....	20	
Gluten feed	10		Ground oats	30	
Ground oats	20		Wheat bran	40	
Corn meal	20		Oil meal	10	
Oil meal	10				
No. 2.		Lbs.	No. 4.		Lbs.
Wheat bran	30		Ground oats	25	
Corn meal	25		Corn meal	25	
Ground oats	30		Wheat bran	20	
Oil meal	15		Malt sprouts	20	
			Oil meal	10	

No. 5.	Lbs.	No. 7.	Lbs.
Dist. grains	30	Wheat bran	40
Wheat bran	30	Corn meal or hominy	30
Ground oats	20	Dist. grain or gluten feed.....	20
Corn meal	15	Cottonseed meal	10
Oil meal	5		

No. 6.	Lbs.	No. 8.	Lbs.
Wheat bran	40	Wheat bran	40
Ground oats	35	Distillers' Grains	40
Gluten feed	25	Cottonseed meal	20

A complete ration for a cow weighing approximately 1,000 lbs. may be made by feeding 1 lb. of grain for every 3 or 4 lbs. of milk produced in addition to:

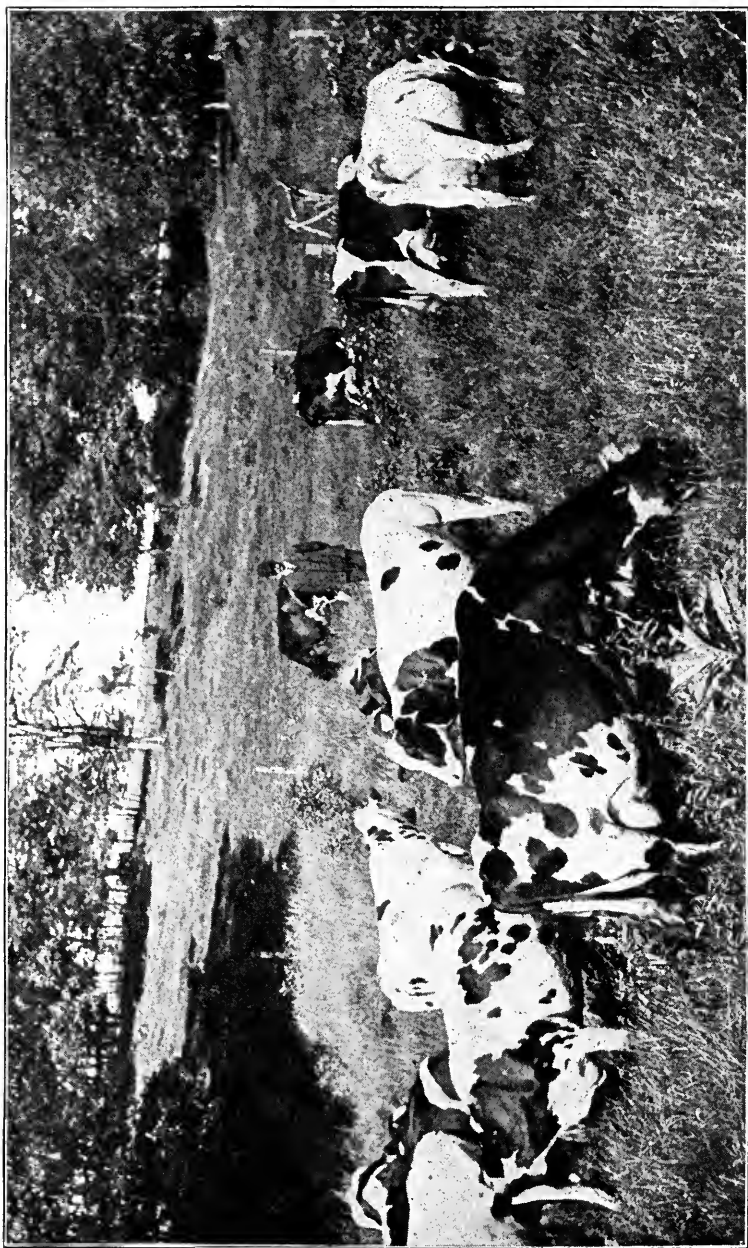
- 30 lbs. of corn silage or soiling, and 10 lbs. hay, (clover or alfalfa preferred), or
- 30 lbs. roots and 15 lbs. of hay, or
- 8 lbs. dried beet pulp soaked 12 to 24 hours prior to feeding and 10 lbs. hay, or
- 20 lbs. of hay with 1 to 2 lbs. of oil meal extra.

Cows which give milk of high percent of butterfat should receive 1 lb. of grain for every 3 lbs. of milk produced, and cows exceeding 1,000 lbs. in live weight should receive a relatively larger amount of hay and silage or roots. If dried distillers' grains are not available, gluten feed, dried brewers' grains or malt sprouts, with preference in the order named, may be substituted for them. Barley, hominy, rye or Kafir grain may be substituted for corn. Equal parts of bran and corn meal are a substitute for oats when prices and the available supply necessitates. Cotton seed meal does not have the laxative property that oil meal contains, but with succulent feeds like silage and roots and other laxative feeds like bran, clover and alfalfa hay, may be fed to good advantage as a substitute in supplying protein.

THE COMPOSITION OF FEEDS.

Feeds for dairy rations are selected and purchased largely on the basis of their values and composition. Feeding stuffs are composed primarily of water, crude fiber, crude protein and fat. The more important compounds that all feeds contain and that should be carefully considered in the selection of feeds for rations are: dry matter, crude fiber, protein, carbohydrates and fat.

Dry Matter.—The portion of a feeding stuff that would remain if the water or moisture contained therein were driven off by heat. It constitutes the main mass or bulk of feeds. An excess of moisture should be guarded against. It may incur the loss of feed and in buying one does not want to pay for more moisture than is necessary.



Good pasture saves buying feed in summer.

Crude Fiber.—The woody portion of feeds having a low nutritive value. Farm grown grains of good quality range in fiber from 2 percent for corn to approximately 11 percent for oats. Wheat bran of good quality averages about 10 percent fiber, although it is most often guaranteed at 11 or 12 percent. As a rule it is not good economy to buy concentrated feeds containing more than 12 to 14 percent crude fiber unless there is some compensating factor like high protein content or a price per ton that warrants their substitution for other more expensive feeds.

Protein.—The portion of feeding stuffs which contains nitrogen. The whites of eggs and the casein or cheese part of milk are good examples. Feed containing a high protein content are frequently spoken of as nitrogenous feeds. Oil meal is a good example. Protein is used in the animal body essentially for the production of muscular tissue, tendons, hide, hair and the casein or cheese part of the milk.

Carbohydrates.—The elements of feed rich in carbon and containing oxygen and hydrogen. They do not contain nitrogen. Sugar and starch are good examples. Carbohydrates and fat serve the purpose of supplying the animal body with heat, energy for work, material for the repair of the body tissues, the formation of body fat and the fat in milk. Feeds containing a high percent of carbohydrates and a comparatively low percent of protein are frequently called carbonaceous feeds. Corn is a good example.

Fat.—The oil of feeds. Fat serves the same purpose as carbohydrates and is 2.25 times as valuable.

BUYING FEEDS FOR DAIRY RATIONS.

The greatest opportunity to profit in buying feeds is:

To learn to know the quality and values of different kinds of feeds for milk production.

To know where, when and how feeds may be secured at the most reasonable prices.

To co-operate with other dairymen in buying feed in large quantities.

To have a suitable place for storing purchased feeds where their cleanliness and palatability will not be lessened by rats, mice and dampness.

DESCRIPTION AND DEFINITION OF CONCENTRATED FEEDS.

A brief description of the concentrated feeds commonly used in mixtures for dairy cattle in the Northwest will be helpful in selecting and utilizing them.

Corn.—Corn in the form of meal or chops regardless of its being dent, flint or of various colors, is valuable as part of a dairy ration. It is palatable and one of the best sources of energy. On account of its low protein contents and heavy nature, it is best to feed it in combination with feeds of bulkier and comparatively heavier protein contents. Commercial corn meal, corn chop and corn feed meal may be considered equal in feeding value.

Corn meal may be the entire ground corn grain or corn meal and by-products of corn grain. The corn feed meal is the sifting obtained in the manufacture of cracked corn and table corn meal. Corn germ meal or germ oil meal is the corn germ layer from which a part of the oil has been extracted and is secured in the manufacture of starch, glucose and other corn products. It is not ordinarily used in dairy rations.

Corn and Cob Meal.—Corn and cob meal is the result of grinding corn and cob. In order to lighten and give bulk to the mixture, ear corn is often ground for dairy rations. It should be finely ground to insure best results and avoid digestive disturbances.

Gluten Meal and Gluten Feed.—Gluten meal is a corn by-product remaining after the starch germ and bran have been removed in the process of manufacturing cornstarch and glucose. Gluten feed is the finely ground combination of gluten meal and corn bran. It is very frequently used in mixtures of considerable variety, to supply protein in dairy rations. A mixture of equal parts of gluten feed and wheat bran with corn silage and alfalfa hay has proven satisfactory as a ration for dairy cows.

Continental Gluten Feed.—This by-product is a dried distillers' grain and should be considered in a class with distillers' grains rather than as gluten feed.

Hominy Feed, Hominy Meal, Hominy Chop.—These feeds are a mixture of bran, the germ and a part of the starchy portion of corn obtained in the manufacture of hominy grits and brewers' grits. It is similar in composition to corn meal, is somewhat bulkier and keeps better in storage. It is a suitable feed to take the place of corn meal in dairy rations.

Wheat By-products.—Bran, shorts or standard middlings, flour or wheat middlings and Red dog flour are by-products of wheat suitable for dairy rations.

Wheat Bran.—This is the outer coatings of the wheat kernel. It is generally regarded one of the very best feeds for cows. It is slightly laxative, keeps the cow's digestive system in good condition and gives bulk and palatability to the ration. Bran contains a high proportion of phosphorus and potash in its ash content. 25 to 50 percent of a mixture for dairy cows can well be bran. The price and other available feeds should determine the amount used. Bran that is pure has a higher feeding value than bran with mill run screenings which is pure bran plus the screenings which are separated from the wheat used in preparing the bran. In buying large quantities of bran it is well to secure samples and buy subject to them.

Shorts or Standard Wheat Middlings.—Shorts or standard wheat middlings consist of the finer particles of bran with considerable flour adhering.

Flour or Wheat Middlings.—These are the portions of ground wheat separated from the fine flour and coarse bran.

Red Dog Flour.—This is a low grade of wheat flour containing chiefly the wheat germs. It is comparatively rich in protein and more valuable than middlings. These feeds are less bulky, less laxative and contain a smaller

quantity of ash than wheat bran. They are slightly higher in protein and in total nutrients than wheat bran and usually higher in price. Their pasty condition when moist necessitates using them in mixtures having considerable variety to insure palatability.

Wheat Screenings.—They consist of broken, shrivelled wheat kernels, weed seeds and other foreign material. Screenings should be finely ground to overcome the growth of noxious weeds from seeds which may pass uninjured through animals and be carried to the fields in manure. They may be regarded as more valuable for sheep feeding than for dairy rations. Except as bran with mill-run screenings in the ration, they are not generally used for dairy cattle.

BARLEY, OATS AND RYE.

Barley.—Barley is a palatable feed and substitute for corn meal where the price permits. Like corn it should be ground and fed in combination with other feeds that increase the bulk and protein of the mixture.

Oats.—When ground oats compare with bran in price, they are well adapted for feeding dairy cattle. They are bulky, palatable and slightly laxative. The price should determine the amount included in grain mixtures.

Rye.—Rye is not especially palatable and tends to produce a tallowy butter. Its composition is similar to corn and if fed to dairy cows should be mixed with other feeds.

Emmer or Speltz.—This grain is a part of the wheat family grown in semi-arid regions. In composition it is similar to barley and corn. Feeding trials with dairy cows indicate that its value is more than 10 per cent less than that of barley or corn.

BUCKWHEAT BY-PRODUCTS.

Buckwheat Hulls.—These are the black wheat hulls of buckwheat grain and have little feeding value.

Buckwheat Middlings.—These are the part of the kernel immediately under the hulls which are separated from the flour in the process of milling. They are heavy and are best fed in comparatively small quantities in combination with other feeds. They are often a cheap source of protein.

Buckwheat Bran or Feed.—This is a combination of middlings and a given per cent of hulls, and possesses a feeding value considerably lower than that of middlings.

Dried Distillers' Grains.—The dried residue from corn obtained in the manufacture of alcohol and distilled liquors constitutes a bulky, palatable, high protein feed for dairy cows. Dried distillers' grains from rye possess less than two-thirds the value of dried distillers' grains from corn. 25 to 40 per cent of the grain mixture for dairy cows can well be corn dried distillers' grains.

Brewers' Dried Grains.—These grains are the properly dried residue from cereals used in the manufacture of beer. They constitute a bulky feed rich

in protein. In combination with feeds that insure palatability they serve well in dairy rations. It is often necessary to develop the appetite of cows for them by gradually introducing them into the mixture.

Brewers' Wet Grains.—The freshly extracted residue obtained in malting and brewing grains for beer provides a suitable feed for dairy cattle. On farms near breweries where the grains can be secured and kept and utilized in a fresh, wholesome condition, 20 to 30 lbs. per head daily may be fed with hay and other roughage.

Malt Sprouts.—As a source of protein, malt sprouts mixed with other feeds to insure palatability, may be fed to good advantage to dairy cows. They are the shrivelled sprouts from dried malt grains. The amount fed daily should not exceed 2 lbs. unless they are soaked before feeding.

Linseed Oil Meal.—The ground residue of flaxseed obtained in the process of extracting oil from flaxseed, can well be 5 to 20 per cent of the grain mixture for dairy cattle. Old process oil meal refers to the residue obtained from crushing the flaxseed and pressing out the oil. New process oil meal is the result of crushing the flaxseed and dissolving out the oil meal with naphtha. In the United States nearly all the linseed oil meal is made by the old process which is regarded the better process from the feeder's standpoint. Oil meal is laxative and is valuable for conditioning animals as well as in furnishing protein.

Cotton Seed Meal and Cotton Seed Feed.—Cotton seed meal is the finely ground residue secured in extracting oil from cotton seed. The meal is graded on the basis of its protein content. **Choice** refers to meal excellent in quality, sweet in odor, yellow in color without excess of lint and contains at least 41 per cent of protein. **Prime** refers to meal similar to choice and contains only 38.6 per cent protein. **Good** refers to meal finely ground, not necessarily bolted, however, of sweet odor, reasonably bright in color and must contain at least 36 per cent of protein. Cotton seed meal is slightly constipating and is used largely as a source of protein. Prices often warrant using 5 to 20 per cent of cotton seed meal in mixtures for dairy cattle.

Dried Beet Pulp.—The dried residue of feeds used in the manufacture of sugar is commonly used as a feed for dairy cattle. This feed is best used when soaked 24 hours prior to feeding it and fed in combination with other feeds. Approximately 8 lbs. of dried beet pulp soaked 12 to 24 hours offers a substitute for green roots or corn silage. The pulp is often fed to good advantage, to give variety to rations for test cows.

Alfalfa Meal.—Commercial alfalfa meal is the entire alfalfa hay ground without an admixture of ground alfalfa straw or foreign materials, except in combination with molasses to keep down the dust and with feeds that require greater bulk and palatability, alfalfa is best fed to dairy cattle in the form of hay. Dairy men desiring to use alfalfa meal should consider the possibility of grinding their own hay and mixing it to suit their needs.

Mixed Dairy Feeds.—These vary in their character owing to the nature of the materials of which they are composed. Some possess merit and others

cannot be considered desirable feeds. Mixed dairy feeds containing less than 8 per cent of crude protein and as much as 20 per cent of crude fiber, do not constitute good concentrated feeds even if sold at attractive prices.

DAIRY FARM ORGANIZATION.

A well organized and well tilled dairy farm does much to provide suitable feeds and to reduce the cost of feeds for dairy cattle. A rotation that will provide an abundance of corn silage, alfalfa, clover or mixed hay, one or more cereal grains and pasture in rotation or of a permanent kind, should be adopted and secured as early as possible.

Pastures in most sections cannot be depended upon for feed throughout the summer and soiling crops or the silo for summer silage should be provided. The following tabulation of crops offers a suggestion on a series of crops that may be grown for soiling purposes. The acreage under average conditions is considered sufficient for ten cows that have the benefit of good grass pasture for right pasture.

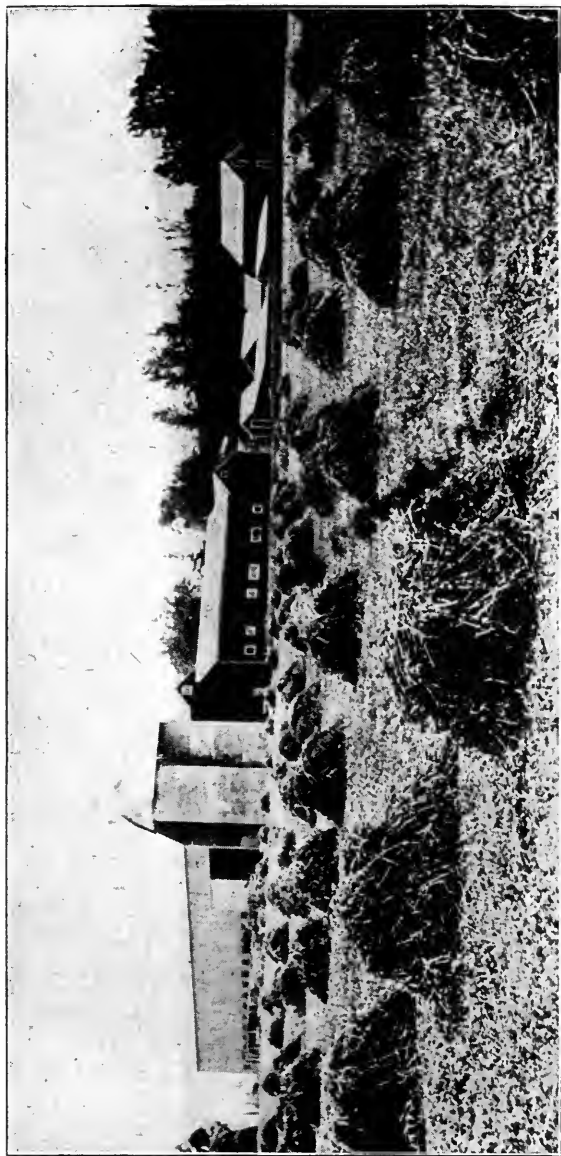
A SUCCESSION OF SOILING CROPS FOR DAIRY COWS

CROP	Pounds Seed per Acre	Time of Sowing	Approximate			Degree of Maturity	Pala- tability
			Time of Cutting	Daily Feed per Cow	Acre- age for 10 Cows		
Fall rye.....	168	Sept. 10	May 15-June 1	38	1/3	Before blooming	Poor
Alfalfa.....	20	.....	June 1-15	36	1/3	Before blooming	Fair
Red clover....	20	.....	June 15-25	36	1/8	In bloom	Fair
Peas and oats.P 60-O48		Apr. 16	June 25-July 5	32	1/6	In milk	Average
Peas and oats.P 60-O48		Apr. 26	July 5-15	32	1/6	In milk	Average
Oats.....	80	May 5	July 15-25	32	1/6	In milk	Average
2d crop alfalfa.....		.....	July 15-30	36	.....	Before blooming	Average
Rape.....	2.5	May 26	Aug. 1-15	42	1/8	Mature	Good
Flint corn.....		May 20	Aug. 15-25	40	1/8	In silk	Very good
Sorghum.....	50	June 1	Aug. 25-Sept. 10	39	1/10	When well headed	Very good
Evergreen sweet corn.....		May 31	Sept. 10-25	39	1/8	In silk	Very good
Rape.....	2.5	July 20	Sept. 25-Oct. 10	42	1/8	Mature	Good

Total acreage..... 1.9

Soiling Crops vs. Silage for Dairy Cows.—There are several reasons why the silo is a better source of feed for cows in summer than land seeded to soiling crops:

It requires less labor to grow corn for silage than it does to grow a variety of soiling crops.



A good barn with silos and an abundance of home grown feed makes dairying most profitable.

The seed for a crop of corn to put into the silo costs less than the seed for sowing soiling crops.

The labor required to put up and feed a given amount of silage will be less expensive than the labor required to secure and feed soiling crops. The inconvenience of feeding silage will also be much less.

Corn for silage returns a large tonnage per acre and is much less susceptible to loss due to drought or over-ripe condition.

Silage provides a more uniform feed as regards quality and palatability than one is assured of getting in soiling crops.

On the whole it is much easier to control conditions that insure good silage than it is to control those which insure good soiling crops.

Silos and Silage.—The organization of dairy and general live stock farms is not complete without one or more silos. Silos made of concrete, brick, wood and other materials which insure an air-tight wall, are in general use, and satisfactory. The chief differences between silos are in cost, durability and expense for repairs.

Crops Suitable for the Silo.—A silo is most valuable for the storage of corn that is harvested when the ears are nicely glazed or the crop is ordinarily ready to be put into the shock. Peas and oats cut when the oats are in the milk or dough stage, freshly cut clover and alfalfa, a mixture of corn and clover, alfalfa or soy beans, shock corn or stover mixed with beet tops, and refuse from canning factories, may also be stored in the silo to good advantage. Two bushels of peas and one bushel of oats mixed and sown at the rate of two bushels per acre, can usually be cut with a grain binder and handled very conveniently when ready for the silo. They make an excellent means for providing summer silage for dairy cows where there is not an abundance of corn silage. Clover or alfalfa is best made into hay and only when the weather does not permit good hay being made is it advisable to put these crops into the silo. Late cuttings of these crops mixed with corn, increase the amount and add to the protein content of silage.

Silage an Economic Feed.—Three tons of corn silage contain practically the same amount of digestible nutrients as one ton of hay and require only one-third as much storage space. The entire plant is usually put into the silo, thus there is the least chance of waste. The loss of dry matter from corn when shocked, husked and handled in the usual manner, ranges from 20 to 25 percent. Properly put into the silo the loss is only 5 to 10 percent, and the crop is preserved in a manner to yield a uniform quality of feed as long as it lasts, and comes the nearest to being a substitute for good grass pasture of any other feed.

Corn silage is especially valuable for dairy and beef cattle, sheep and horses. Hogs like it, but do not utilize it in a manner to warrant their receiving it. All classes of animals need to be gradually accustomed to silage, after which dairy cattle may receive 25 to 40 pounds per head daily, beef and growing cattle 15 to 20 pounds, sheep 1 to 2 pounds, and horses 10 to 15 pounds. Horses must be fed judiciously and guarded against colic.

A silo on a dairy farm saves 25 to 30 percent of the amount of hay other-

wise required. It provides excellent succulent feed with which to supplement or replace summer pastures that are short or spoiled by drought.

Silo Troubles Not Serious.—Mold, due to improperly mixing and packing the silage at time of filling, or not feeding it at a rate to keep the surface from spoiling, and freezing in winter are the chief difficulties experienced with silos. Moldy silage is injurious and must not be fed. Frozen silage is dangerous and should not be fed until after being thawed out, when it is perfectly wholesome if fed before mold develops. In winter time one should be careful to keep the surface level or the outer edges slightly lower. Silage freezes from the top and more about the edges than in the center. Covers to keep out the cold made with straw or blankets are helpful.

Location of the Silo.—The silo to protect the silage from freezing should be located if possible at the south side of the barn. In extremely cold sections it may be advisable to build the silo inside the barn. The diameter of the silo should be such that it can be fed down at the rate of $1\frac{1}{2}$ to 2 inches over the entire surface each day. This rate of feeding is necessary to prevent mold and to insure the best quality of feed. A silo of small diameter is most suitable for summer feeding.

When to Fill the Silo.—Corn makes the best silage when the majority of the ears are dented or are just beginning to glaze. If corn is put into the silo before this stage of maturity is reached, the silage becomes very sour or acid and will have a low feeding value.

If the crop is allowed to get over-ripe or dry it does not pack well and being deficient in moisture is almost certain to produce moldy silage.

Moisture Necessary for Good Silage.—When the corn becomes dry from being allowed to get ripe or due to frost, good silage can be made from it if water is added at the time of filling. No definite rule can be given as to the right amount of water to add. A sufficient amount should be used to insure having the corn well packed. The water should be added during the process of filling, otherwise it may fail to reach all the parts and thus cause moldy silage. Water can be run into the blower or distributed in the silo by means of a hose.

Length to Cut Corn for Silage.—Silage is usually cut in $\frac{1}{2}$ -inch lengths. If cut longer than this the cows refuse to eat the coarser portions of stalks and thus cause waste. Dull cutter knives increase the amount of power required to cut the corn and also leave it in a shredded condition which makes it difficult to properly pack the silage.

Distribution of Corn in Silo Important.—It is very essential that the cut corn be well distributed at the time of filling. If this is not done the heavier portions will fall in one place and the higher material in another. This will cause the mass of silage to settle unevenly and spoiled silage will result. Thoroughly mixed fodder and corn are also desirable to insure best results in feeding.

Silage Must Be Well Packed.—During the process of filling the cut material should be kept slightly higher at the edges than in the center and should be well tramped against the sides where the friction of the silage against the wall tends to prevent settling. Tramping in the center of the silo is not neces-

sary for the weight of a man is small compared to the weight of the silage. Silos that are deep and of small diameter require less tramping than those of larger dimensions. Two competent men in a silo who understand the importance of securing well packed silage are insurance against loss.

Sealing the Surface.—It is not necessary to put on any cover after filling is completed. A few inches of the top will always spoil. If the ears are removed from the last few loads of corn nothing will be lost except the fodder. If there happens to be some refuse close by such as weeds, slew grass, or waste from the barn floor, to put on, the saving will pay for the extra labor. The usual practice of sealing is to wet down the surface immediately after filling and to tramp thoroughly several times during the first week. By this method a seal of rotten silage will form on the top and only a few inches will be spoiled. This crust should not be broken until feeding begins when all the spoiled silage should be removed and discarded.

The silo should be well ventilated until heating and fermentation is over.

Silage from Sugar Beet Tops and Shock Corn.—Sugar beet tops and shock corn have been successfully cut up together for silage at the University of Wisconsin. The silage had a slightly stronger odor than the ordinary corn silage but was not offensive. Cows relished it and did as well on it as they did on regular corn silage. Chemical analysis showed that this silage had practically the same feeding value as clear corn silage. Professor Henry states that the leaves of sugar beets have about half the feeding value of the roots. Taking into consideration this fact one is impressed with the importance of utilizing the beet tops for feed. Making them into silage with corn fodder proved so satisfactory that it seems worth while to publish the fact as a suggestion to the many farmers who grow large crops of sugar beets and who are undoubtedly facing the problem of how best to utilize the tops for feeding purposes.

After the beets were removed from the field, the tops which had been left in small piles were run through an ensilage cutter into the silo with about an equal quantity of corn fodder taken from the shock. By throwing beet tops onto a large layer of corn and running both through the cutter together, no difficulty was experienced in getting the beet tops cut. Enough water was added to the cut material to give it proper moisture and make it pack well when two men tramped it during the time of filling.

The Dairy Barn.—No cow can be kept in a healthy condition in a dark, poorly ventilated stable. Sunlight is a disinfectant and insures healthy cows and conditions under which milk can be produced in a most satisfactory manner. Barns 36 feet wide and extending lengthwise north and south are best lighted. Four to six square feet of window sash should be provided for each cow. The stable should be properly ventilated and kept clean as well as supplied with plenty of light. The King system of ventilation which provides a circulation of fresh air and at the same time renders the stable comfortably warm, is highly recommended. This system admits air through flues with opening into the stable near the ceiling, and draws the stable air out through another set of flues with openings from the stable near the floor of the stable. The Rutherford system of having

a more direct intake and outtake of air with the amount properly regulated, is also highly recommended.

Frequent applications of whitewash over the walls and ceiling of the stable, keep stables clean and disinfected. Cobwebs and dust should not be allowed to collect. Where hay is kept in a loft above the stable, there should be no cracks in the floor through which dust can sift. Dust that rises at feeding time and in the process of bedding cattle, should have settled before the hours of milking. The stable manure should be removed frequently and doors and windows screened during fly seasons. It pays to groom cows and wipe the udders with a damp cloth just prior to milking; use half-covered pails in which to milk and strain the milk through a strainer provided with a layer of absorbent cotton. These practices render milk most free from dirt and bacteria.

The Production and Handling of Market Milk.—To further insure the highest grade of market milk, the milkers should be provided with clean, white suits and have facilities for washing their hands before milking each cow. Dairy-men should also be particular to have men in charge of the herd and employed to do the milking who are in perfect health and who especially are free from contagious and infectious diseases. The expense of producing milk with bacteria reduced to a point below 10,000 per cubic centimeter, the standard for certified milk, necessitates dairymen receiving prices for their milk that are considerably above the ordinary prices charged for market milk.

Milk is highly perishable and susceptible to foreign odors and flavors. Every precaution must be taken to avoid contamination. All utensils used for milk should be carefully washed by using washing powders, sterilized with boiling water or live steam and kept where they will not come in contact with dust or dirt. Pails, cans and containers of all kinds should be constructed in a manner to have all cracks filled with solder or the surface with which the milk comes in contact perfectly smooth, to prevent the collection of dirt or stale milk that is the source of contamination.

The milk room should be separated from the stable, and be provided with walls and floors which are easily washed and cleaned. The doors and windows should be screened and ventilation provided to insure the circulation of pure, fresh air. A milk room provided with hot and cold water, racks for utensils and arranged for the convenient handling of milk, is essential to the successful handling of milk.

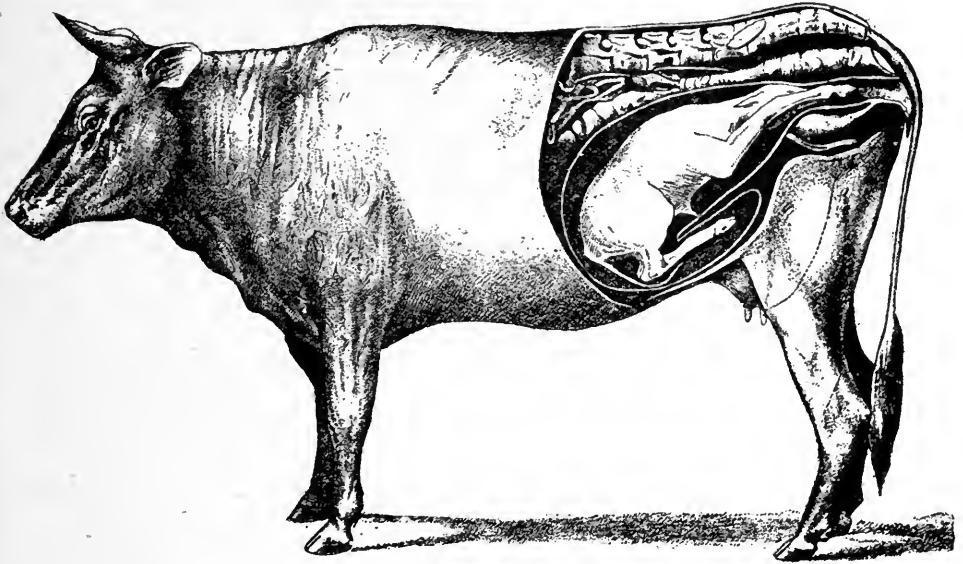
As soon as milk for the market is drawn from the cow, it should be properly cooled and bottled or put into containers and kept cool. The quicker this can be done after milking, the less difficulty there will be in keeping the milk sweet and wholesome. Warm milk should never be mixed with cool milk. Milk that has to be separated for producing cream or for standardization purposes is best separated immediately after milking and then subjected to the cooling process.

The care and handling of market milk does not cease with the delivery on the part of the producer. The patron who is supplied must see to keeping the milk where it will remain cool and be free from bad odors, flies and other sources of contamination. The producer should emphasize this fact to safeguard his business.

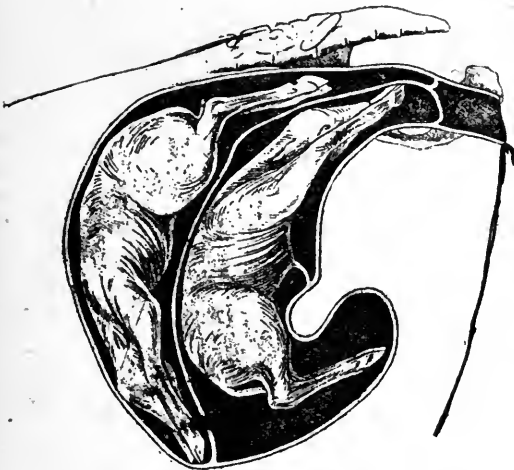
RAISING DAIRY CALVES.

The best way to get a profit-producing dairy herd is to use only good, pure bred sires, take good care of the cows, and keep the calves "coming" right from birth. Too much emphasis cannot be laid upon a good sire.

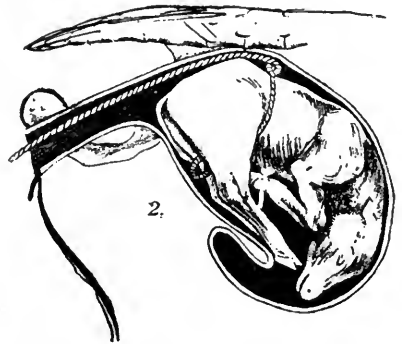
The Dairy Sire.—There are three qualifications which every sire should



Normal position of calf in utero.



Showing position of twin calves in womb.



Method of putting rope on calf to assist cow in calving. Clean, well oiled hands should be used in pushing rope into neck of womb.

possess. He should be pure bred and from a family of cattle having high milk and butter fat production records.

He should be a well developed, strong, vigorous, individual possessing depth and length of body indicating feed capacity and a muscular and angular condition of body indicating a dairy disposition.

His dam should be of ideal type and character and capable of a large milk and butter fat production. The proof of the value of every sire is in his get. It is desirable to select mature sires that have proved themselves capable of producing heifers that are of the most desirable type and character. Too many sires are sacrificed before one has an opportunity to appreciate their value.

The Calf Should Be Well Born.—To give the calf as well as its mother a fair chance, a cow should be carefully dried off six weeks before date of calving. This allows her to feed well her unborn calf and to get ready for her period of milk production. Cows that are not given such rest usually produce weak and undersized calves. In such cases both the cow and her calf are seriously handicapped.

From two to four pounds of grain a day, equal parts of bran and oats and one pound of oil meal, make a good feed for the cow during the dry or rest period. The amount of grain to be fed will, of course, depend upon the condition of the cow. She should be placed in a clean and comfortable box stall several days before calving.

Give Calf Colostrum, or "First Milk."—The calf should be left with its mother for the first two to four days so that it may get the colostrum, or "first milk." From then until it is four weeks old it should be fed from two to five pounds of its mother's milk three times a day. Many experienced breeders feed calves which are weak a smaller amount but give it four times a day. It is well to remember always that there is more danger from overfeeding a young calf than from under-feeding it. Have the pails clean and the temperature of the milk as near as possible that of freshly drawn milk, or about 95 to 100 degrees F.

Feed Skim Milk and Silage During Fifth Week.—During the fifth week change gradually from whole to skim milk. Do not increase the amount fed until about the eighth week, when the calf needs from 6 to 10 pounds twice daily. Froth, which rises on separator milk, should not be fed to calves. It is almost sure to produce indigestion, bloat, and scours. If available, skim milk can be fed profitably until the calf is a year or more old. In order to get the greatest returns from the milk, the amount fed to any calf should not exceed 20 pounds per day. Corn silage, free from coarse cobs and butts, and fed in small amounts, makes a good feed for calves which are a month or six weeks of age.

Feed Hay and Grain Carefully.—When the calf is from ten days to two weeks old give it a small amount of choice mixed clover or alfalfa hay. A little later feed a very small amount of grain and increase the allowance gradually as the young animal develops. It is well to keep a calf a little hungry, rather than to tax its digestive organs. A calf's appetite and the condition of its bowels are the two arms to the guide-post which mark the course the feeder should follow.

Prevent young calves from eating coarse butts of fodder or cobs from silage as these will cause serious indigestion and scours. Nothing of this kind should

be left in the feed or bedding. Occasionally, a craving appetite for hay and straw results in too much being eaten and indigestion follows. In such cases separate the ailing calf from its mates and reduce its feed until the appetite becomes normal.

Don't Allow Calves to Suck One Another.—The calves should be separated and penned in groups according to their ages. They can be fastened in stanchions when milk is fed and grain can be supplied them immediately after they drink. Feeding the grain at this time and keeping them locked in the stanchions until the grain is eaten, helps to overcome the habit of sucking. Calves that continue to suck one another after being turned loose should be separated or some other means taken to prevent the practice. Heifers often have their udders injured by being sucked.

Grain Mixture for Calves.—A good grain mixture for young calves consists of 50 parts of whole oats, 30 parts of wheat bran, 10 parts of corn meal, and 10 parts of oil meal. After calves are six months old less grain will be wasted if it is ground. The amount of grain fed should vary from a small handful for the young calf to three pounds, or possibly more, in some instances, to heifers from 24 to 30 months of age. If, for any reason, a heifer is thin, an extra amount of grain should be fed to get her in good condition.

Feed Calves Regularly the First Year.—During the first year feed the calves regularly in the barn and turn them out for exercise in shady paddocks or during the nights only. This will insure satisfactory growth at an age when it may be secured at lowest cost. Supply water and salt to the calves daily.

Grow Well and Breed the Second Year.—During their second year feed or pasture the heifers in such a way as to get the maximum growth. It has been found that the most productive and profitable cows are produced by getting the maximum growth from birth to maturity. Heifers which are bred at from 16 to 20 months of age and that are in good flesh at calving time usually develop satisfactorily.

Keep Stables Clean.—Calf pens should be kept clean and comfortable. The calves should be protected from cold cement floors by board overlays. Cold draughts of air often prove fatal and should be carefully avoided. Abundant window space lets the sunlight in during the winter and in the summer can be darkened to keep out flies and heat. The stable needs ventilating so as to supply fresh air and to regulate the temperature. Young calves should never be exposed to a hot, burning sun. Watch the calves carefully and whenever necessary, treat them for lice and ringworm.

Raising Calves on Oil Meal Gruel.—Where skim milk is not available for feeding purposes, calves are likely to suffer and make an unsatisfactory growth. However, if care be taken calves may be grown successfully without skim-milk. In one of the prominent cheese districts of Wisconsin it was an interesting fact that very few calves were fed whey. The whey is fed to pigs and the calves raised on whole milk, oil meal gruel, and hay and grain. The usual practice is to feed whole milk regularly until the calf is from four to six weeks old. Then a tablespoonful of oil meal, thoroughly cooked, is added to a pint of water and substituted for a pint of the whole milk. Every third day following, an

additional pint of water and a tablespoonful of cooked oil meal is substituted for a pint of the whole milk until half the milk ration consists of oil meal and water. This half and half mixture is usually continued until the calf is from three to four months old and able to do well on the ration of hay and grain.

The Whole Milk Method.—In a prominent condensery district a breeder of fine Holstein cattle who gets splendid size in his cows, feeds whole milk until the calves are twelve weeks old and then depends on whole oats, hay and pasture.

In all instances calves should be encouraged at as early an age as possible to eat grain and hay. Oats alone, or bran and oats, or a mixture of 50 parts oats, 30 parts bran, 10 parts corn meal, and 10 parts oil meal make a good grain ration. Hay of fine quality, and preferably well cured second cutting of clover or alfalfa, should be fed. Pure fresh water should be supplied daily. Calves should have free access to salt at all times and everything should be done to provide clean and comfortable quarters.

How Whey May Be Used.—If whey is used for raising calves, it should be sweet and clean and fed at about the temperature of freshly drawn milk. Each patron of a cheese factory should have special cans for getting as much whey each day as will be needed for the calves and have these filled directly from the cheese vat. Whey from the general whey vat is likely to be sour or otherwise unfit to feed to calves. Sweet whey should only be fed after the calf has been well started on whole milk.

One man reports good results from feeding sweet whey and shelled corn. If a handful of shelled corn is thrown into the whey the calf soon learns to eat this immediately after drinking the whey. Whey, shelled corn, good hay and pasture, when in season, together with good care, gave good results for this stockman.

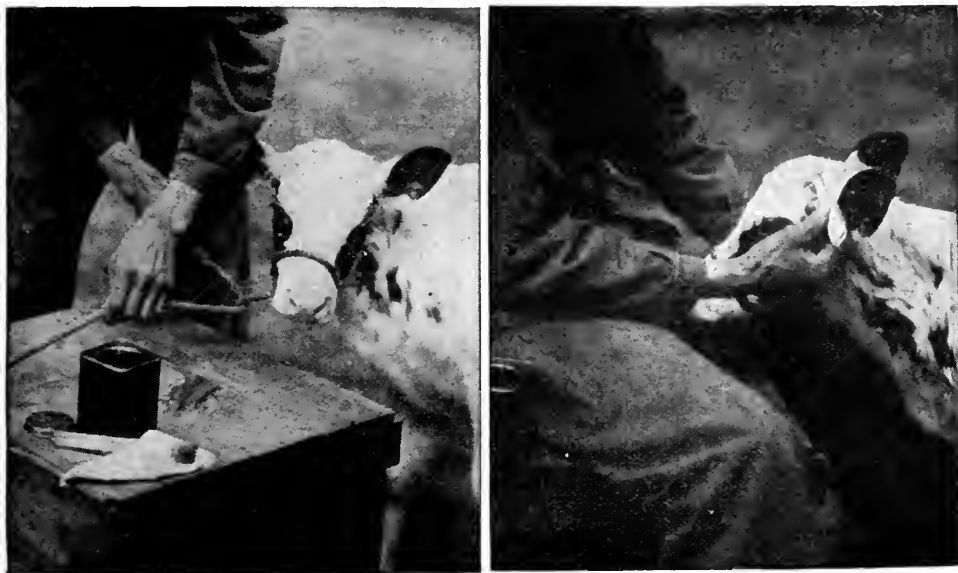
Treating Calves for Scours.—Calves that scour may be treated successfully in several ways if the case is not too serious. It is well to have one good remedy for serious cases and the following may be recommended:

As soon as symptoms appear, from two to four tablespoonfuls of castor oil are mixed with one-half pint of milk and given to the calf. This is followed in from four to six hours by a teaspoonful of a mixture of one part salol and two parts subnitrate of bismuth. This mixture can be purchased at any drug store and will be ready for use at any time. The powder can be given in one-half pint of milk or placed on the calf's tongue and washed down with a small amount of milk. The allowance of feed should be reduced at once and not increased until the condition of the calf warrants. In mild cases castor oil is unnecessary and therefore can be omitted. Forcing the calf to eat an egg and the shell, feeding lime water and give a tablespoonful of wheat flour are simple home remedies that are used successfully.

Precautions Against Scours.—Special care needs to be taken to avoid scours. Tincture of iodine or a solution of one part bichloride of mercury (corrosive sublimate) to 500 parts of water applied several times to the navel of the new born calf, safeguards against contagious scours. It is important to have the cows calve in disinfected, clean, well lighted, well ventilated pens, and to

keep the calves in similar quarters. The following points are important to bear in mind:

Do not overfeed; have milk at proper temperature; feed milk regularly and from pails that are scrupulously clean; if possible, feed the calf its mother's milk; if necessary to feed other milk, choose a cow which has recently freshened and continue regularly with her milk; make any changes in feed gradually;



Dehorning the calf with caustic potash. A convenient method of securing the calf and doing the work suggested in the picture. Read method of dehorning calves.

guard against feeds or materials that will produce indigestion like sour milk, moldy, very coarse or woody feeds, and paint, blankets, sacks, etc., which calves will sometimes eat; keep calves clean, dry, and out of cold draughts of air.

Dehorning Calves with Caustic Potash.—For several years calves born at the Wisconsin University Farm have been dehorned by the use of caustic potash and it has been demonstrated that this method is successful when properly applied.

The caustic potash should be applied as soon as the "buttonlike" horns can be felt, which is usually when the calf is three to ten days old. If postponed, the operation will be unsatisfactory. To apply the potash, remove the hair from about the horns close to the skin. Moisten the potash slightly and run it over the skin which covers the points of the horns until the skin is white.

Do not rub the skin until blood comes, as this will cause unnecessary soreness. One such treatment is usually sufficient to prevent the growth of the horns.

The following precautions need to be taken: the caustic should be wrapped in

heavy paper so as to protect the hands of the operator; the caustic should be only slightly moistened; too much moisture will cause the liquid to run down the side of the calf's head, and cause unnecessary pain; the calf must be securely fastened so that its head may be held still to avoid applying the caustic anywhere else than upon the horns. Preserve the stick of caustic potash in a tightly corked bottle, and you will have enough to dehorn many other calves.

Treatment for Lice and Ringworm.—Thoroughly washing or dipping calves is the most effective means of destroying lice. Unless special provision has been made for doing so, it is unsafe to wash calves in cold weather. Usually a two to three per cent solution of some of the coal tar disinfectants is recommended for washing stables and for washing or dipping calves for lice. The solution should not be strong enough to irritate the skin. A good remedy for lice on calves may be made by steeping for four hours four ounces of Larkspur (Delphinium) in one gallon of boiling water, then straining and applying the liquid to the affected parts. In the winter, if the calves are badly infested with lice and the weather is too cold to wash them, pyrethrum powder may be used to advantage. As a general rule, however, lice powders are not as effective as thoroughly washing or dipping calves with some disinfectant.

Ringworm may be successfully treated by washing thoroughly the affected part of the skin and applying a liquid made by dissolving two ounces of sulphate of copper (blue stone) in one gallon of boiling water.

BEEF CATTLE PRODUCTION.

The Production of Pure Bred Beef Cattle.—Breeding pure bred cattle is the highest type of beef cattle production and represents the largest investment and the greatest amount of capital necessary for successful operation. One engaged in the production of this class of cattle must also understand methods of breeding, feeding and developing live stock in a manner to impress buyers favorably and to secure profitable prices. It is necessary to depend upon the demand for breeding stock in order to sell and secure prices that are profitable. The production of pure bred beef cattle is ordinarily confined to well organized and productive farms and it is considered best for one to graduate into this class of producers after having had considerable experience and having gained a thorough knowledge of the cattle industry.

Cattle for Meat Purposes.—The production of cattle primarily for meat purposes includes three lines of industry, namely, the production of stockers and feeders, the grazing of cattle and the fattening of cattle. The section of the country, the character of the land and the organization of the farm should determine what line of cattle production will be best for one to select. Pure bred beef cattle not suitable for breeding purposes, grade beef cattle resulting from the use of pure bred sires for several generations, and cross bred beef cattle are all well adapted for meat purposes and should be selected where one depends upon producing beef as the primary object in live stock production.

The Production of Stockers and Feeders.—Stockers and feeders constitute classes of cattle suitable for grazing or fattening and may be profitably produced on well organized farms having more or less land that cannot be plowed

SCORE CARD FOR BEEF CATTLE.

SCALE OF POINTS	Pos- sible score	Points Deficient		Points Deficient	
		Student's score	Cor- rected	Student's score	Cor- rected
GENERAL APPEARANCE—26 POINTS					
Weight, estimated.lbs., according to age...	6				
Form, straight top line and underline; deep, broad, low set.	8				
Quality, firm handling; hair fine; skin pliable; fine bone; evenly covered with firm flesh.	8				
Style, active, upstanding.	1				
Temperament, quiet, docile.	3				
HEAD AND NECK—8 POINTS					
Muzzle, good size, mouth large; lips thin, nos- trils large.	2				
Eyes, large, clear, placid.	1				
Face, short, quiet expression.					
Forehead, broad, full.	1				
Ears, medium size, fine texture.	1				
Neck, thick, short, throat clean.	2				
FOREQUARTERS—13 POINTS					
Shoulder Vein, full.	3				
Shoulder, covered with flesh, compact on top, snug	4				
Breast, wide; brisket prominent.	2				
Dewlap, skin not too loose and drooping.	1				
Legs, straight, short; arm full; shank fine, smooth	3				
BODY—28—POINTS					
Chest, full deep, wide ;girth, large; fore-flank, full	6				
Crops, full, even with shoulders.	3				
Ribs, deep, arched, thickly fleshed.	5				
Back, broad, straight, evenly fleshed.	8				
Loin, thick, broad.	5				
Flank, full, even with underline.	3				
HINDQUARTERS—25 POINTS					
Hips, smoothly covered; distance apart in pro- portion with other parts.	4				
Rump, long, even, wide; tail head smooth, not patchy.	5				
Pin Bones, not prominent, far apart.	3				
Thighs, full, wide, deep.	5				
Twist, deep, plump.	4				
Legs, straight, short; shank fine, smooth.	2				
Total.					
	100				

(Score card used at Wisconsin College of Agriculture.)

profitably, but which yields excellent pasture. In addition to an abundance of pasture there should be a sufficient amount of tillable land to produce roughage for the maintenance of breeding and other stock retained during the winter. Silage, clover, alfalfa and a cereal crop are well adapted and highly essential to this type of farming and cattle production. A given amount of commercial feeding stuffs to supplement roughage will be profitable in maintaining the breeding herd and growing the young stock successfully. Herds of high grade beef cattle headed by pure bred sires of the strictly beef breeds, produce the most profitable grades of stockers and feeders.

Cattle Grazing.—In the West on ranches and in other sections of the country where large areas of land are unadapted for the cultivation of farm crops and where the seasons are suitable, cattle may be grazed in a manner to be profitable. Cattle for this purpose are largely purchased and shipped in by trainload or driven across the country. The feeding season is limited to the months during which pasture grass grows and is provided in abundance. The larger and older classes of stock cattle graze and finish on grass pasture to a better advantage than do younger cattle. The character of the land and the amount of grass which it produces, the character of the season which affects growth of grass, and the matter of securing cattle of suitable type and quality at prices which permit a margin of profit, are factors that enter into the success of the grazing industry.

Pasture Conditions.—Mistakes are frequently made in buying and grazing cattle by misjudging the amount of feed available. One should become a judge of pasture lands and understand the approximate amount of feed a given area of land will supply under ordinary conditions before investing too much money in cattle for grazing purposes. The more land over which steers have to run to secure ample feed, the less favorable will be the results. Land that does not provide native or tame grasses in abundance is questionable for beef cattle grazing. One having land suitable for grazing should do everything possible to secure a good stand of grass. This may be accomplished by destroying noxious weeds, draining land that may be too wet, disking and harrowing in clover, timothy and other grass seed, and applying top dressings of stable manure or commercial fertilizer. Remembering that beef cattle require luxuriant pastures, one will not turn them onto pasture until the grass has attained a good growth and also be careful not to overstock a given area of pasture land.

Clover, alfalfa and other crops for pasture, grown in rotation with other farm crops, may be utilized to good advantage under proper supervision. The system of pasture that will provide the greatest amount of feed and the largest returns in beef, may be regarded best for a respective locality and type of farm. The climate and amount of rainfall have a marked influence upon the amount of feed a given pasture will provide and judgment will always have to decide to what extent other feed should be used to supplement pasture or in what manner extenuating circumstances shall be met. Rotating cattle from one to another of two or more fields, using meadow land after hay has been removed and grass has made a start, will be beneficial to both cattle and pasture land. Corn silage

where it can be produced, is one of the most valuable feeds for supplementing pastures that become scant or are too limited in area for a given number of cattle.

Turning Cattle Onto Pasture.—Cattle not accustomed to grass should be gradually changed to it. This is true in the case of turning onto any luxuriant grass pasture and especially should one be careful in turning cattle onto clover or alfalfa. It overcomes the difficulty and danger of serious loss from bloating and a good plan is to turn cattle to grass for only an hour or less the first day after they have been well filled on regular feed and the grass is free from dew or wet. Allow them to remain on the pasture for a little longer time each succeeding day until their systems have become accustomed to the grass as indicated by the bowel condition when the danger is past and they may be allowed to remain on pasture continuously. It is always a safe precaution to watch cattle closely and be prepared to treat cases of bloat while they are being accustomed to pasture. Having access to dry feed, hay or straw after coming off the pasture, helps cattle to correct for themselves any abnormal conditions that might arise from too much grass being eaten when first turned to pasture.

Fattening Cattle on Grass.—Best authorities agree that if cattle have been grain fed during the winter with the idea of marketing them in early summer, it is best not to turn them to pasture at all. Two and three year old cattle that have been wintered largely on roughage will make gains on luxuriant pasture that may be more profitable than gains made in any other manner. A lower price is usually paid for grass-fat cattle than for corn-fed cattle and the character and value of land and the cost of producing gains, should determine the policy of utilizing the pasture land. Young cattle under two years of age which are to be marketed for beef during or at the close of the pasture season, will require continuous grain feeding. Older cattle in fair condition of flesh can be marketed to good advantage by giving them a full grain ration in addition to pasture and turning them off about the middle of July before the fly season or dry, hot weather comes on.

Corn is one of the best concentrates used in combination with pasture. Shelled corn should be soaked 12 to 18 hours prior to feeding it to overcome its dry and flinty nature at this season of the year. For young cattle and for older ones that it is desirable to finish in the shortest possible time, the corn should be fed with some concentrate like oil meal, cotton seed meal or gluten feed rich in protein. Clover or alfalfa pasture make the rich protein feeds less necessary. Steers fed corn on pasture should be followed by hogs which utilize the droppings from the steers to a better advantage on pasture than they do in the feed lot.

Fattening Cattle in the Feed Lot.—In corn belt regions where the land is practically all tillable and capable of growing large yields of corn and other feeds adapted for fattening purposes, it is profitable to fatten steers in feed lots during the winter months. Corn fed cattle, well finished, produce beef in the largest quantities and of the best quality. Steers for fattening purposes are purchased usually at the leading cattle markets and fed for periods ranging from 90 to 160 days. Much of the profit in fattening steers depends upon the type and quality of steers selected and one's ability to buy them at the proper time and at

suitable prices to insure a fair margin when they are returned to market in finished form. A market classification of cattle can be found in the market reports of any reliable live stock journal which should always be consulted carefully during the seasons of buying and selling live stock of any class. The following classification without market prices is submitted. "Class" indicates the use to which cattle are put, and "Grade" the quality or degree of fitness of the animal in a given class.

MARKET CLASSES AND GRADES OF CATTLE.

Classes	Grades	Classes	Grades
Beef Cattle.	Prime Steers Choice Steers Good Steers Common Rough Steers	Stockers and Feeders...	Fancy Selected Feeders Choice Feeders Good Feeders Medium Feeders Common Feeders Inferior Feeders Feeder Bulls Fancy Selected Yearling Stockers Choice Yearling Stockers Good Yearling Stockers Medium Yearling Stockers Common Yearling Stockers Inferior Yearling Stockers Good Stock Heifers Medium Stock Heifers Common Stock Heifers
	Prime Heifers Choice Heifers Good Heifers Medium Heifers		
Butcher Stock...	Prime Cows Choice Cows Good Cows Medium Cows		
	Common Rough Steers Common Bulls Good Bulls Medium Bulls		Choice Good Medium Common
Cutters and Canners...	Good Cutters Medium Cutters Common Cutters and Good Canners Medium Canners Inferior Canners Bologna Bulls		
		Sub-Classes.	Texas and Western Range Cattle Distillers
		Miscellaneous...	Baby Beef Export Cattle Shipping Steers Dressed Beef Cattle Stags

STAGS.

The Most Desirable Type of Beef Cattle.—What are classified on the general market as beef cattle, constitutes the most desirable type of cattle on the market. In general this type includes animals that are blocky in form, with a short, broad head, a short neck, and a broad, deep, low set body with straight and parallel top and bottom lines. In finished form there is a thickness and mellowness of flesh over the entire body, indicating a finished condition. Beef cattle have the characteristic disposition of taking on fat over the entire body, more or less of which is mixed with muscle fibers to produce the rich, marble condition so much appreciated in a good carcass of beef. The steer that is compact, with a short, broad back, wide top line, deep, thick thighs, and a full twist, not

only produces the best quality of beef, but the highest percentage of dressed carcass and commands the highest market price. It requires experience to feed and finish steers that will top the market and at the same time be most profitable. Not infrequently does the feeder of beef cattle realize greater profits on feeding cattle of the commoner grades and classes than he does on feeding better cattle.

Advantages In Finished Cattle.—There are three reasons for feeding and producing a finished condition of the steer. It increases the percentage of dressed carcass, renders the beef most tender and juicy and insures its curing properly when hung in the cooler. The evidences of steers being finished in the feed lot are fullness at the throat, well covered shoulder points, thickness of the flank and a full purse or scrotum. When cattle approach this condition, quotations should be watched and the cattle disposed of at the most opportune time. The amount of feed required for producing a pound of beef increases as the feeding period advances and one cannot afford to feed finished cattle except to secure an advance in the market price.

The Feeding Margin.—The difference between the cost price per 100 lbs. and the selling price per 100 lbs. is known as the margin. Without a sufficient margin it is impossible to make a profit in fattening steers or to secure market prices for feed supplied to them. Ordinarily 800 to 1,000 lbs. of concentrated feed is necessary to produce 100 lbs. of meat. The cost of producing gains at this rate, makes it evident that in order to secure a profit, there must be a considerable margin between the cost and the selling prices. The following factors influence the necessary margin in fattening cattle:

Distance necessary to ship cattle to and from feed lots.

Shrinkage in cattle during shipments.

Expenses incident to buying, selling and shipping.

Losses which may result by accident or disease.

Prices for feeds and cost of producing gains.

Other Conditions Influencing Margin.—The class of cattle fed have an influence on the margin required as does also the season of the year and the character of the winter months. A wider margin is necessary in winter than in summer because the cost of gains at this season is greater. Young cattle are fed more economically than are mature cattle and may be fed on narrower margins.

A uniformly good class of feeder steers can be fed on a narrower margin than a poorer class of feeders, when both classes are relatively high. In some instances, however, poor feeders are relatively lower in price than the difference between their quality and the quality of a better class of feeders would warrant, and under such conditions one may sometimes secure a better margin and greater profits in feeding such classes. Margin must necessarily increase as the length of the feeding period and the cost of feeding increases. The heavier the cattle fed the less the margin must necessarily be. It is evident that the necessary margin will vary under different conditions of time and circumstance. By taking into account all the items of cost

and probable loss in buying and feeding a lot of steers, one can calculate the approximate margin necessary to break even or make a given profit. When cattle are finished or the feeding period is about to close, one should study the market situation and endeavor to sell in a manner and at a time to make the actual margin, which is the difference between the cost price and the selling price, as great as possible.

Suitable Rations for Fattening Steers.—Rations to be most satisfactory for fattening steers must conform to the age of steers and their ability to make the best use of them, to the condition of the cattle and the length of the period they are to be fed, to the stage of the feeding period and to the prices for cattle and feed. The tendency at the present time is to fatten cattle before they are full grown and take advantage of the more economical gains that occur with the younger classes of cattle. This is a good tendency where cattle are grown on valuable land and quick returns on the investment are required. The ration in this instance must be suitable for growing and fattening, otherwise a proper finish will not be secured. Legume hay and nitrogenous concentrates, together with a liberal supply of fattening concentrates are required. Young cattle do not have the strength to eat and masticate shock and ear corn that older cattle have, and greater preparation of the ration like crushing, chopping or grinding the corn is necessary.

Cattle that are thin may be profitably fed for longer periods than cattle in good flesh, during the first part of which the ration may consist of good roughages that will be reduced as concentrated feed takes its place with the advance of the period. The cattle in this instance should make gains that will produce the desired finish at the time it is aimed to dispose of them. Heavy cattle as a rule should be fed a heavy allowance of concentrates that will produce a finish, to satisfy the market demands in as short a period as possible.

The ration for fattening cattle should become heavier as the feeding period advances. Corn and a liberal allowance of legume hay may be sufficient to make good gains in the early part of the feeding of comparatively thin steers. With the advance of the period, however, and as the hay is reduced and the corn increased, a nitrogenous concentrate like cotton seed, gluten feed or oil meal will prove profitable.

When the market is slow and does not pay a premium for highly finished steers or the market price of feed and cattle is not such as to warrant fair profits in feeding, one should regulate the ration accordingly.

Silage from well matured corn is fast becoming a popular feed for fattening steers. The cost of producing silage may be considerably more than feeding shocked corn, but the amount of fodder saved and the results secured may be regarded sufficient to more than offset all of the extra labor. The shrinkage on steers fed corn silage at time of marketing has been one of the principal objections to silage as part of the ration. This objection, however, is largely overcome by substituting dry feed in place of the silage a few days prior to shipping. Grass in abundance and more or less shelled corn

constitute suitable summer feed for fattening steers. The corn should be soaked 12 to 18 hours and barrels or boxes in which it is soaked kept clean and sweet.

The following average rations will be suggestive in preparing rations for steers in the feed lot and for securing the most satisfactory results:

Shocked corn	15	lbs.
Clover or alfalfa hay.....	7	lbs.
Ear corn	13	lbs.
Oil meal, cotton seed meal or gluten.....	1½	lbs.

Clover or alfalfa hay.....	9	lbs.
Shelled corn	16	lbs.
Gluten feed, oil meal or cotton seed meal.....	3	lbs.

Clover or alfalfa hay.....	8	lbs.
Corn and cob meal.....	20	lbs.
Gluten feed, oil meal or cotton seed meal.....	3	lbs.

Getting Steers on Full Feed.—The amount of feed supplied all steers must be comparatively small when cattle are first put into the feed lot and the amount gradually increased until they are on full feed. Mumford of Illinois recommends that cattle be given all the clover or alfalfa hay they will eat and in addition 2 lbs. of corn per steer per day to start with. The amount of grain can be increased one pound daily until 10 lbs. per head daily is reached. After three days increase the daily ration one pound again until 17 lbs. is fed; 15 days later this amount can be increased to 22 lbs. Cattle getting from 12 to 15 lbs. of corn daily should have 12 lbs. of clover or alfalfa hay per 100 lbs. of live weight. As the amount of grain increases the hay should be reduced to about one-fourth of the ration. The length of the feeding period should determine how rapidly the ration is increased from day to day. Where the feeding period is to be 180 days, thirty days to six weeks should elapse before the cattle are on full feed. Judgment on the part of the feeder in watching steers consume the feed from day to day and in watching the condition of the bowels should largely govern the amount of feed supplied.

Use of the Self-Feeder.—The use of the self-feeder offers two advantages, it economizes labor and is regarded by some feeders as being more reliable than a careless man who may be entrusted with the work of feeding. The self-feeder must be used judiciously, however, to overcome objectionable features incident to its use. Cattle must be accustomed to their grain ration and practically on full feed before being allowed access to the self-feeder. The self-feeder is best adapted to long feeding periods or where cattle are to be fed liberally from three to four months. Watching the self-feeder and the condition of the cattle in addition to the precautions incident to getting them onto full feed, should overcome objections to its use. It has been suggested that the self-feeder may be used to advantage from the start

by shredding or cutting the roughage and mingling it with the concentrated feed prior to putting it into the self-feeder. Under these conditions cattle may be safely turned to the feeder as soon as they are turned into the feed lot, and as the feeding progresses the roughage can be reduced to the extent that the cattle utilize concentrates to the best advantage.

Hogs Should Follow Cattle.—It is unprofitable to feed steers without hogs in the feed lot. Decreasing the cost of preparing feed is an item of saving in the steer feeding operation. The usual manner of feeding corn incurs considerable waste unless hogs follow the steers and utilize that which would otherwise be wasted. Hogs weighing 100 to 150 lbs. that are active and capable of making good gains, are best for the steer lots. Hogs that are too fat are not active enough to serve the purpose. Brood sows and a small class of hogs are very likely to be injured and, are therefore, unprofitable. The age of the cattle and the character of the ration fed to them, determines the amount of feed available for the support of the hogs, and the character of the feed will also affect the gains made by the hogs.

On the average the number of hogs per steer in the feed lot according to the Missouri Experiment Station, Bulletin 76, should be as follows for rations of different character, the steers being two-year-olds and the hogs weighing 100 to 150 lbs.:

Snapped ear corn	2 to 3 hogs per steer
Ear corn	1½ hogs per steer
Shelled corn	1 to 1½ hogs per steer
Crushed or ground corn	1-3 to ½ hog per steer

It is profitable to include more hogs than are necessary to utilize the waste and to supply additional feed to the extent that the hogs are satisfied and do not disturb the steers too much.

Equipment for Cattle Feeding.—Ordinarily feeding sheds about 20 ft. deep and of sufficient length to accommodate a given number of steers with lots or yards approximately 24 ft. deep and feed bunks suitable for supplying grain, constitute the equipment for fattening steers. It is advisable to have the shed arranged to offer as much shelter as possible from prevailing winds and storms. The roughage may be fed in racks inside the yard or shed or in racks located in yards adjoining the shed where the cattle can be turned. Feed bunks in which concentrates and silage are fed, should be made of heavy material. It is advisable to so construct them that they can be moved about from place to place as circumstances necessitate. They should be arranged in a manner to make feeding most convenient. Having the feed lots paved or the floors arranged to keep the droppings where hogs have the best chance to get them will be an advantage. The condition of many feeding lots is unsatisfactory at seasons of the year and in localities where the ground does not freeze and becomes wet and muddy. Experiments indicate that a sufficient gain and return is secured as a result of having the feed lots in suitable condition to justify the expense of paving and main-

taining them in good condition. Steers in a muddy condition do not command the best prices on the market. Grading the yard in a manner to control the water that comes in contact with it, will be helpful and should be done whether the lots are paved or not.

General Care of Fattening Cattle.—The operation of fattening cattle should not be regarded as an easy task. The feeder has many details to keep in mind. Excitement prevents cattle from making the largest gains and the feeder should endeavor to do everything possible to keep cattle in a quiet condition. Successful feeders endeavor to gain the confidence of cattle in charge and do their work with the regularity that does not disturb them from their usual habits of eating and resting. The majority of cattle feeders feed cattle grain and roughage twice a day in winter and under summer conditions grain once a day. Steers may run in bunches of 100, although it may be more convenient to feed and handle them in groups of 50 which will require three feed bunks, 3 feet wide and 15 feet long. The size and age of the cattle would affect the number most conveniently fed in a given yard.

Salt and Water for Fattening Cattle.—Cattle should have free access to salt, and pure, clean water supplied in the feed lot. Advantages in feeding dehorned cattle make it desirable to have cattle of the stocker and feeder types dehorned prior to being put into the feed lot. A difference of 10c to 25c per hundredweight is frequently made, due to the presence of horns. The shrinkage in weight during shipment is also less with dehorned cattle and as a rule they are quieter and subject to few bruises.

Grooming Fattening Cattle.—Some cattle feeders advocate grooming fattening cattle. The practice is not generally considered a necessary one, however, for best results. Only in the case of carload lots of show cattle can it be generally recommended. It is desirable, however, to have posts or other arrangements that will enable cattle to rub and thus groom themselves. Under summer conditions fattening cattle may be protected during the heat of the day by placing strips of burlap across the doorway or opening of the shed. The darkened shed is undoubtedly the most practical method of overcoming the difficulty with flies.

Marketing Cattle.—Selling cattle at home to local buyers or shipping them to packing house centers are two ways of disposing of them. The condition of the market, quality of the cattle, number of cattle one has and one's familiarity with market conditions, should determine which plan will be adopted. Selling to the local buyer is the only plan where one has only a few cattle to sell. Cost of shipping and commission charges do not warrant shipping less than a carload lot. There is less risk in selling to local buyers for the reason that the home market is always steadier than is the larger market and the expenses are reduced to the minimum. On a declining market it is well to sell at home. To ship on a falling market is unsafe unless there is necessity for doing so and the home market is very unsatisfactory. There is opportunity to sell to advantage to the home buyer when

the general market is rising. It pays the feeder well to be well posted on market conditions.

If one has two or more cars of stock in fit condition to sell and understands the market conditions, there is no reason why he should not ship and sell on the market. Selling in this manner insures the producer getting all the possible profit that might go to the local buyer. He also incurs the same risk of losing that is incurred by the shipper. Shipping and accompanying stock to the market offers advantages in one's becoming familiar with market types and classes and their values. To be on the market with cattle enables one to come in contact and make the acquaintance of men from many sections of the country and to gain a knowledge of their methods, conditions and opinions, which is valuable from the standpoint of fattening cattle in the most profitable manner. To make the acquaintance of commission firms at the leading markets also secures their interest in one's welfare and it should be understood that they are glad to keep feeders posted accurately on market conditions and the most suitable times for buying and selling to the extent that it is possible for them to do so.

How to Ship Fat Cattle.—The feed for fat cattle should be changed for a day or two prior to loading cattle for shipment in order to avoid undue shrinkage. Cattle fed silage, grass or beet pulp are subject to greater shrinkage than cattle fed otherwise unless particular precaution is taken. In all instances cattle should be filled when loaded, with feed having as little moisture in it as possible like the best of hay and whole oats if any grain is supplied. Clay, of the Chicago Union Stock Yards, writes: "A steer full of water is apt to have loose bowels and show up badly in the yards. Properly handled cattle should arrive in the sale pens dry behind and ready for a good fill of water; not very thirsty, but in good condition to drink freely. As to feed on the road, nothing excels corn or other grains because it is easily digested and does not fever the animal. Cattle should arrive at the sale yards at 5:00 to 8:00 A. M., appearing on the scene as near the later hour as possible since they always look better just after they have been fed and watered."

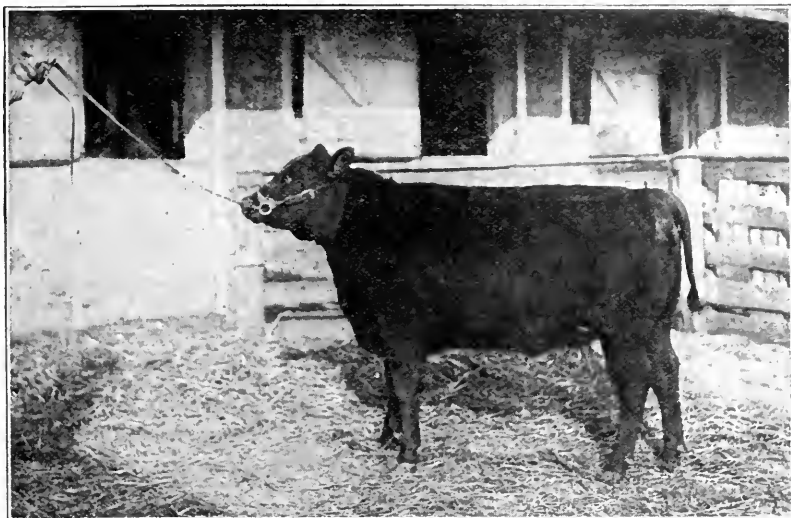
BABY BEEF PRODUCTION.

Farms that are worked intensively on which beef cattle are maintained have in many instances adopted the practice of producing baby beef. Cattle falling within this classification are from one to two years of age, and ordinarily weigh about 1,000 lbs. Only well bred beef cattle capable of producing calves of quality and natural beef tendencies are adapted to the production of this class of cattle. Breeding high grade and cross-bred animals of beef type may be regarded excellent for baby beef production. Beef cows that tend to produce large quantities of milk add much to the initial growth and quality of baby beefs.

Mumford in writing on the subject, states that profitable baby beef production requires experience, judgment and skill of a high order and that it is a mistake for the inexperienced to dip heavily into this enterprise.

Successful producers endeavor to keep the calf in the milk fed bloom until

it is marketed. Calves should be accustomed to grain before they are weaned and must be fed continuously on rations that will prevent shrinkage at any time. Any shrinkage in baby beef production is expensive and lengthens the time required to mature them. Good roughage such as clover or alfalfa hay, silage during the winter months and abundant pasture during the summer, together with corn, oil meal and other grains to give variety, where prices permit their being used, should be supplied in a manner to keep the calves in a fat condition as they develop. Liberal feeding is necessary for the reason that calves tend to grow rather than fatten. Heifer calves tend to fatten more quickly than steer calves.



A type and finish desirable in baby beef production.

Male calves should be castrated before they are weaned and this may be done when the calf is less than one week old. Vaccination to prevent blackleg is recommended. It is seldom possible to get spring calves ready for the baby beef market before July of the second summer. More frequently they are not marketed until the fall when they are approximately 18 months of age.

General Care of the Breeding Beef Herd.—Cows of the breeding beef herd should be cared for in a manner to maintain them in the most economical manner and at the same time keep them in a condition to produce strong, vigorous calves that will develop rapidly while getting the benefit of nursing their dams. Cows may be wintered at a more reasonable cost if bred to drop their calves in the spring of the year. This is also regarded the best time to have the calves dropped for the production of baby beef steers to be finished off at two years of age.

Where pasture is available it is more economical to secure growth and gains on the part of calves during the summer than during the winter. Beef cows will

also produce more milk during the summer season with which to give the calf the best start in its development. In the case of cows that are milked and calves that are hand raised on more or less skim milk, there is undoubtedly more profit in having cows freshen in the fall of the year. In any event cows should be bred in such a manner that the calves of the herd will be as nearly uniform in age as possible. The breeding herd should be culled from time to time of cows that do not possess the size and ability to produce calves of the most desirable type and character for beef production.

Feeding the Breeding Herd.—Beef cows that have access to good pasture will require little attention during the pasture season. Where pastures become short to affect the milk flow of the cow or cause her to seriously reduce in flesh, it is best to supplement the pasture with silage, clover or alfalfa hay, soiling crops or concentrated feeds. An abundance of pure, fresh water, shade and salt should be provided.

In winter the cows should be fed in a manner to keep them in a thrifty, normal condition of flesh. No more grain should be fed than is necessary. A ration of corn silage and good clover or alfalfa hay under ordinary conditions will be highly satisfactory. A ration composed of 18 to 20 lbs. corn silage, 4 lbs. clover hay and cheaper roughage like straw, corn stover, should provide ample feed for keeping cows in good condition and gaining 1 to 1¼ lbs. per day. Where silage is not available, shocked corn and clover hay together with straw may be fed to advantage. Where cheaper and lower roughages are utilized enough grain should be supplied to keep cows in a thrifty condition.

Methods of Rearing Beef Calves.—Beef calves may be reared in one of three following ways:

On farms where cattle are raised primarily for beef production, it is customary to allow calves to run with their dams until six or eight months of age.

Calves should be taught to eat grain before being weaned to prevent shrinkage at weaning time. A good grain mixture for beef calves consists of corn meal 50 parts, ground oats 30 parts, wheat bran 20 parts. In addition to this grain mixture clover or alfalfa hay should be fed in such quantities as calves will clean up without waste. Cotton seed meal is not a good feed for young calves. Daily gains of 1½ to 2 lbs. should be expected.

In some instances half the cows of the herd are hand milked and the other half are required to nurse two calves. Under this system it is best to select the easy and heavy milkers for hand milking and let the calves nurse those that are indifferent. Additional calves may be bought if necessary to have all cows nurse two calves. Where two calves nurse one cow it is well to have a shady paddock or stable in which calves spend the day and are turned with cows to nurse twice daily. Grain and other feeds should be supplied in such quantities as to keep them growing and in a good condition of flesh at all times. In some instances beef calves are raised by hand and the cows hand milked throughout their lactation periods. In such instances the calf is left with the dam for only two to four days and raised practically in the same manner with all of the precautions heretofore discussed with reference to raising dairy calves.

RINGING THE BULL



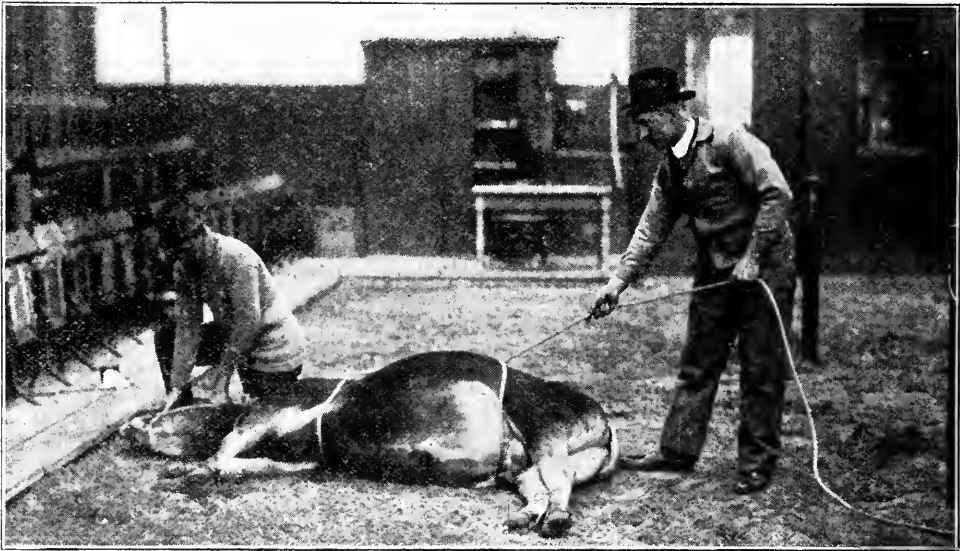
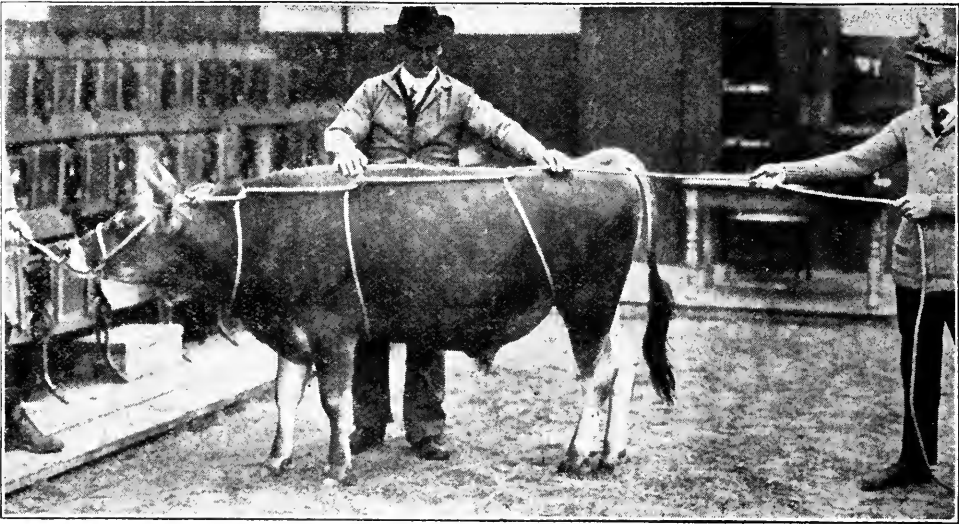
Act 1. Snub the bull's head securely to a post, letting a second man hold the rope in order to loosen it should the bull throw himself, and insert a trocar and canula.



Act 2. Withdraw the trocar and insert ring by letting open end follow the canula as it is withdrawn.



Act 3. When the ring has been closed and secured file off any rough points about the joints of the ring to prevent their irritating the nose.



Throwing the bull. Note adjustment of rope and loops that tighten naturally at all points about the body as the rope is drawn. The rope should be secured about the horns or to a halter in the case of a polled animal in a manner to insure against its slipping.

A sufficient amount of grain of the mixture suggested for beef calves should be fed to keep the calf in a thrifty, growing and well fleshed condition. The amount of grain fed a beef calf varies from a handful up to 4 or 5 lbs. at six months of age.

Heifers that are to be retained for the breeding herd should be bred at the age of 18 to 20 months of age.

SELECTION AND MANAGEMENT OF BULLS.

Selection of Bulls.—In the dairy or the beef herd there is no more important duty than the selection, care and management of bulls suitable to head the herd. In all instances the bull should be a pure bred, registered animal with ancestors representing the leading families and the most typical individuals of the breed. In no instance can a breeder of cattle feel himself justified in using a bull of common or indiscriminate breeding. Beef bulls should be the progeny of animals that excel in the production of beef and dairy bulls the progeny of cattle that excel in the production of milk and butter fat. Improvement in the beef and dairy cattle interests of the country can be accomplished most economically through the selection of choice bulls.

Management of Bulls.—Under some conditions it may be advisable to allow the bull to run with the cows. In most instances, however, it is more desirable and much better to keep the bull by himself in quarters especially provided for him. Such quarters should consist of a strong pen and paddock in which he can be comfortably housed and permitted to exercise, and at the same time be handled without incurring the danger of his doing injury to attendants in charge. Bulls should be kept in a thrifty condition but not in high condition of flesh where best results in using them are to be secured. An abundance of exercise and a moderate ration of legume hay, grain during the breeding season and a small amount of silage not to exceed 10 to 15 lbs. should keep the bull in suitable condition for doing best service.

The number of cows to which the bull should be bred during the year will depend upon his age, condition and treatment, together with the distribution of the cows bred to him. The bull should not be used for service until a year old. The number of cows bred to him should vary from 12 to 15 during the time he is a year old to 30 to 60 a year when he is full age.

Frequently the feet of a mature bull get into a condition that renders it difficult for him to do service. A bull's feet are best trimmed by throwing him in a manner illustrated in the accompanying cut on opposite page. Bulls that are inclined to be vicious may be rendered manageable by throwing them in a similar manner. At the age of 8 to 10 months a ring should be inserted in the nose of the bull in order to handle and control him without difficulty. Mature bulls should be handled with the staff especially dairy bulls that are more nervous and treacherous than beef bulls. Handling and managing the bull in a manner to never allow him to realize his strength and possibility of gaining mastery over his attendant, should be practiced to the fullest extent. The disposition of bulls is in most instances a reflection of mismanagement at some time in their development.

The greatest mismanagement on the part of many owners of bulls is in disposing of them to the butcher before their merits as sires have been proven. The most valuable bulls are those that have proved themselves capable of siring most satisfactory calves. Prepotency or that power of a bull to get calves of uniform, excellent type and character is rare and for this reason every precaution should be taken to preserve sires that have proved themselves valuable in this respect.

A GUIDE TO DISEASES OF STOCK

In this department the general symptoms are alphabetically arranged so the reader may easily determine what is troubling his stock. The general symptoms of the diseases of each kind of stock are placed just before the treatment of those diseases.

How to Use This Guide.—An animal cannot talk to tell you what the trouble is but he acts and makes signs peculiar to his ailment. To use this guide one only has to observe the actions and appearance of a sick animal, notice any particular symptom and find it in its proper place. When he looks up that symptom he will find the other symptoms of the disease. He can then pick out the group which suits the particular case. This being found he sees the disease indicated and can then look it up in the main department.

Explanation.—The subjects in this department are arranged in alphabetical order so as to help the reader find what he is looking for without even turning to the index. However, a complete index will be found at the back of the book.

DISEASES OF CATTLE.

(GENERAL SYMPTOMS.)

Back arched; belly greatly enlarged especially on left flank; moves slowly; breathes with difficulty.—**Bloat, Page 76.**

Back arched; quick breathing; fast pulse; sweating; poor appetite; colicky pains; high fever; frequent but scanty passage of urine that is dark and thick; moves hind quarters with difficulty.—**Inflammation of the Kidneys, Page 89.**

Back arched; stands alone; moves slowly with a wabbling gait; kicking towards belly; switching tail; as the disease develops there is severe pain and delirium; moaning; bellowing.—**Cornstalk Disease, Page 81.**

Back arched; tail elevated; bowels irregular; milk flow stops; breath offensive; manure streaked with blood; straining severely; high fever; walking slowly; great thirst; loss of appetite.—**Dysentery, Page 82.**

Back has small round lumps on it from which a grub can be squeezed.—**Grubs in the Back, Page 86.**

Belly greatly enlarged especially in left flank; moves slowly; breathes with difficulty; back arched.—**Bloat, Page 76.**

Blisters following red swollen parts; blisters break causing severe lameness; inclination to lie down; chill followed by fever.—**Foot and Mouth Disease, Page 84.**

Blisters on skin which leave the skin moist with their contents; sometimes swelling and large sores; severe itching.—**Eczema, Page 82.**

Blood in Milk.—**Bloody Milk, Page 79.**

Blood in milk; dullness; fever; shivering; pus coming to surface of udder; in some cases there is no pus but udder gets hard; part of udder may fall off in severe cases; udder hot, swollen and tender.—**Garget.**

Bloody, foul smelling fluid runs out of swelling when opened; lameness, stiffness; swelling of affected parts; the swellings emit a crackling sound when rubbed; high fever; poor appetite.—**Anthrax, Page 75.**

Bowels loose; coughing up worms; suffocating sort of breathing; cough dry and husky; poor appetite.—**Filaria Bronchitis.**

Breathing difficult; back arched; belly greatly enlarged especially in left flank; moves slowly.—**Bloat, Page 76.**

Breathing difficult; bowels loose; coughing up worms; cough dry and husky; poor appetite.—**Filaria Bronchitis.**

Breathing fast and hard; loss of appetite; fever; sometimes delirium.—**Blood Poisoning, Page 78.**

Breathing quickened; fever; quick pulse; standing with elbows turned out; well marked crease extending from the flank to the back of the elbow;

coughing; pointing nose toward the side; if the ribs are tapped over the chest a clear hollow sound is heard.—**Pleurisy, Page 94.**

Breathing quickened; rapid pulse; rattling sound heard in lungs when ear is placed to chest; lying down; chill followed by fever which gradually increases for a time.—**Pneumonia, Page 95.**

Chill followed by fever; affected parts red and swollen; followed by blisters which burst and cause severe lameness; inclination to lie down.—**Foot and Mouth Disease, Page 84.**

Chill followed by fever; dullness; discharge of mucus from nostrils that becomes pus-like; constipation.—**Catarrh, Page 80.**

Chill followed by fever; pulse full and rapid; cough short, dry and husky; constipation; poor appetite.—**Bronchitis, Page 79.**

Chill followed by fever which increases gradually for a time; quickened breathing; rapid pulse; rattling sound heard in lungs when ear is placed to chest; lying down.—**Pneumonia, Page 95.**

Colicky pains; high fever; frequent but scanty passage of urine which is dark and thick; moves hind quarters with difficulty; arched back; quick breathing; fast pulse; sweating; poor appetite.—**Inflammation of the Kidneys, Page 89.**

Constipation following diarrhea; legs and ears cold; nose dry and hot; fever; pulse fast and full.—**Inflammation of the Stomach, Page 89.**

Cough dry and husky; poor appetite; looseness of bowels; coughing up worms; suffocating sort of breathing.—**Filaria Bronchitis.**

Cough dry and persistent; diarrhea; animals reduced to skin and bones; poor appetite; eyes lusterless.—**Tuberculosis, Page 98.**

Cough short, dry and husky; constipation; poor appetite.—**Bronchitis, Page 79.**

Crackling emitted from swellings when rubbed; high fever; poor appetite. When one of the swellings are opened a foul smelling, bloody fluid runs out; lameness; stiffness; swellings on affected parts.—**Anthrax, Page 75.**

Crease well marked from the flank to back of elbow; coughing; pointing nose toward side; if the ribs are tapped over the chest a clear hollow sound is heard; quickened breathing; fever; quick pulse; standing with elbows turned out.—**Pleurisy, Page 94.**

Crusty patches on head and neck, under which a pus-like fluid forms; severe irritations and itching.—**Ring Worm, Page 95.**

Diarrhea; animal reduced to skin and bones; poor appetite; lusterless eyes; some coughing.—**Tuberculosis, Page 98.**

Diarrhea followed by constipation; legs cold; ears cold; nose dry and hot; fever; pulse fast and full.—**Inflammation of the Stomach, Page 89.**

Delirium; breathing fast and hard; loss of appetite; fever.—**Blood Poisoning, Page 78.**

- Ears and legs cold; nose hot and dry; fever; pulse fast and full; diarrhea followed by constipation.—**Inflammation of the Stomach, Page 89.**
- Elbows turned out when standing; well marked crease extending from flank to back part of elbow; coughing; pointing nose toward the side; if the ribs are tapped over the chest a clear hollow sound is heard.—**Pleurisy, Page 94.**
- Eyes inflamed and swollen; pulse full; bowels constipated; tips of horns and extremities cold; sneezing; fever; cough; thin, watery discharge from nose, but this soon thickens.—**Catarrh, Page 80.**
- Eyes lusterless; some coughing; diarrhea; animals reduced to skin and bones; poor appetite.—**Tuberculosis, Page 98.**
- Eyes, mouth and nostrils reddened; muzzle and mouth dry; urine colored; pressure on the abdomen causes pain; falling down and moaning; manure covered with slime; flanks heave; gait staggering.—**Inflammation of the Bowels, Page 89.**
- Eyes red and inflamed; lids swollen sometimes; profuse discharge of tears and mucus; strong light irritating.—**Sore Eyes, Page 96.**
- Eyes very red with thick discharge; head hangs; loss of appetite; weakness; constipation; fever; watery discharge from nose; throat sore.—**Pink Eye, Page 94.**
- Falling down and moaning; manure covered with slime and often streaked with blood; flanks heave; gait staggering; nostrils, mouth and eyes are reddened; muzzle and mouth dry; urine colored; pressure on abdomen causes pain.—**Inflammation of the Bowels, Page 89.**
- Falling in partially unconscious condition after staggering; constipation; scanty urine; uneasiness; poor appetite; lessened secretions of milk.—**Milk Fever, Page 93.**
- Falling unconscious; breathing slow; pulse weak and irregular; stopping; panting violently.—**Sunstroke, Page 97.**
- Fear of imaginary objects; fits or crazy spells especially when warm; head trembles violently; sluggishness; difficult locomotion; almost impossible to get up after lying down.—**Loco Disease, Page 92.**
- Fits or crazy spells especially when warm; head trembles violently; sluggishness; difficult locomotion; almost impossible to get up after lying down; fear of imaginary objects.—**Loco Disease, Page 92.**
- Flank drum-like; belly greatly enlarged; moves slowly; breathes with difficulty; back arched.—**Bloat, Page 76.**
- Flank swollen and drum-like; bowels constipated; uneasiness; animal shifts position; moaning.—**Impaction of Rumèn or Paunch, Page 87.**
- Flanks heave; gait staggering; nostrils, mouth and eyes reddened; muzzle and mouth dry; urine colored; pressure on the abdomen causes pain; falling down and moaning; manure covered with slime.—**Inflammation of the Bowels, Page 89.**
- Flesh lost; poor appetite, lusterless eyes; some coughing; diarrhea; animal reduced to skin and bones.—**Tuberculosis, Page 98.**

- Gait wabbling; stands alone; kicking toward belly; switching tail; as the disease develops there is severe pain and delirium; moaning; bellowing.—**Cornstalk Disease, Page 81.**
- Head hangs; loss of appetite; weakness; constipation; eyes very red with a thick discharge; temperature rises to 104 or 105 degrees; watery discharge from nose; throat sore.—**Pink Eye, Page 94.**
- Head has crusty patches under which a pus-like fluid forms; severe irritation and itching.—**Ringworm, Page 95.**
- Head thrown from side to side; switching tail; kicking abdomen with hind feet; lying down often; moaning; grunting.—**Colic, Page 81.**
- Head trembling violently; sluggishness; difficult locomotion; almost impossible to get up after lying down; fear of imaginary objects; fits or crazy spells especially when warm.—**Loco Disease, Page 92.**
- Hind quarters stiff; recurrent fever; gradual falling away in spite of a normal appetite; excessive urination; mucous membranes of the eyes and mouth are pale; extreme weakness. There may be improvement for a time and then the same symptoms will return with more severity until the horse may die from weakness or heart failure.—**Swamp Fever, Page 179.**
- Itching severely; water blisters on skin which leave the skin moist with their contents; sometimes swelling and large sores.—**Eczema, Page 82.**
- Kicking abdomen with hind feet; lying down often; moaning; grunting; switching tail; head thrown from side to side.—**Colic, Page 81.**
- Kicking towards belly; switching tail; wabbling gait; stands alone; as the disease develops there is severe pain and delirium; moaning; bellowing.—**Cornstalk Disease, Page 81.**
- Lameness; stiffness swellings on affected part; these swellings emit a crackling sound when rubbed; high fever; poor appetite. When one of the swellings are opened a foul smelling, bloody fluid runs out.—**Anthrax, Page 75.**
- Legs and ears cold; nose hot and dry; fever; pulse fast and full; diarrhea followed by constipation.—**Inflammation of the Stomach, Page 89.**
- Legs close together; bowels constipated; fever; labored chest breathing; shivering fits; nervousness; turning head to sides; muzzle dry.—**Peritonitis, Page 94.**
- Legs stocky; skin may be scaly and has eruptions; unthriftiness; coat rough; dullness.—**Bad Blood, Page 88.**
- Lids swollen; profuse discharge of tears and mucus; strong light irritating; eyes red.—**Sore Eyes, Page 96.**
- Lumps on back of animal from which a grub can be squeezed.—**Grubs in the Back, Page 86.**
- Manure covered with slime; flanks heave; gait staggering; nostrils, mouth and eyes are reddened; muzzle and mouth dry; urine colored; pressure on the abdomen causes pain; falling down and moaning.—**Inflammation of the Bowels, Page 89.**

Manure dry with glazed covering; muzzle dry.—**Constipation, Page 81.**

Manure thin and watery; weakness, loss of flesh; thirst, back arched; milk dries up.—**Diarrhea, Page 82.**

Milk does not come through teats.—**Blocked Teats, Page 78.**

Milk flow stopped; breath offensive; manure streaked with blood and very offensive; straining severely; high fever; walking slowly; great thirst; loss of appetite; back arched; bowels irregular.—**Dysentery, Page 82.**

Milk given in less quantities; constipation; scanty urine; gait staggering; falls down in partially unconscious condition.—**Milk Fever, Page 93.**

Milk has blood in it.—**Bloody Milk, Page 79.**

Milk is stringy.—**Stringy Milk, Page 97.**

Milk streaked with blood or curdled; dullness; fever; shivering; pus coming to surface of udder; in some cases there is no pus but the udder gets hard; part of udder may fall off in severe cases.—**Garget, Page 79.**

Moaning; left flank hard and swollen; bowels constipated; uneasiness; animal shifts position.—**Impaction of the Rumen or Paunch, Page 87.**

Mouth has discharge of saliva; is red and gives off a foul smell.—**Sore Mouth, Page 96.**

Mucous rope hanging from vulva; vagina has yellow sores on its lining.—**Abortion, Page 74.**

Mucus and tears discharged from eyes; strong light irritating; eyes red; lids swollen.—**Sore Eyes, Page 96.**

Mucus that becomes pus-like discharged from nostrils; constipation; chill followed by fever; dullness.—**Catarrh, Page 80.**

Muzzle dry; manure dry with glazed covering.—**Constipation, Page 81.**

Neck arched; coughing; heavy breathing; poking out nose; frequent attempts at swallowing.—**Choking, Page 80.**

Neck has crusty patches on, under which a pus-like fluid forms; severe irritation and itching.—**Ringworm, Page 95.**

Nervousness; turning head to sides; muzzle dry; legs close together; bowels constipated; fever; labor breathing; chest breathing.—**Peritonitis, Page 94.**

Nose dry and hot; fever; pulse fast and full; constipation following diarrhea; legs and ears cold.—**Inflammation of the Stomach, Page 86.**

Nose has discharge of mucus that becomes pus-like; constipation; chill followed by fever; dullness.—**Catarrh, Page 80.**

Nose has thin watery discharge at first but this soon thickens; eyes inflamed and swollen; pulse full; bowels constipated; tips of horns and extremities of limbs cold.—**Catarrh, Page 80.**

Nose pointed towards side; breathing quickened; fever; quick pulse; standing with elbows turned out; well marked crease extending from the

flank to the back of elbow; coughing; if the ribs are tapped over the chest a clear hollow sound is heard.—**Pleurisy, Page 94.**

Nose, watery discharge from; throat sore; eyes very red with thick discharge; head hangs; loss of appetite; weakness; constipation; fever.—**Pink Eye, Page 94.**

Pains, colicky; high fever; frequent but scanty passage of urine which is dark and thick; moves hind quarters with difficulty; arched back, quick breathing; fast pulse; sweating; poor appetite.—**Inflammation of the Kidneys, Page 89.**

Pains come suddenly in abdomen; animal falls down and moans; manure covered with slime and often streaked with blood; flanks heave; gait staggering; nostrils, mouth and eyes are reddened; muzzle and mouth dry; urine colored; pressure on abdomen causes pain.—**Inflammation of the Bowels, Page 89.**

Panting violently; losing consciousness and falling; breathing slow; pulse weak and irregular.—**Sunstroke, Page 97.**

Patches where there is no hair, on head and neck; pus-like fluid forms under these; severe irritation and itching.—**Ringworm, Page 95.**

Poking out nose; frequent attempts at swallowing; saliva runs from mouth; neck arched; coughing; heavy breathing.—**Choking, Page 80.**

Pimples coming on body following a slight fever of about a week's duration. This fluid soon forms a scab. The scab comes off leaving pock marks.—**Cow Pox, Page 82.**

Protruding of uterus through vagina.—**Eversion of the Womb, Page 84.**

Pulse rapid; rattling sound in lungs when ear is placed to chest; quick breathing; lying down; chill followed by fever which gradually increases for a time.—**Pneumonia, Page 95.**

Rough coat; legs stocky; skin may be scabby and has eruptions; unthriftiness; dullness.—**Bad Blood, Page 88.**

Saliva discharges; mouth red; gives off foul smell.—**Sore Mouth, Page 96.**

Saliva runs from mouth; neck arches; coughing, heavy breathing; poking nose out; frequent attempts at swallowing.—**Choking, Page 80.**

Scabs forming on body from pimples that contained a watery fluid. The scabs come off forming pock marks.—**Cow Pox, Page 82.**

Shivering fits; nervousness; turning head to sides; muzzle dry; legs close together; bowels constipated; fever, breathing labored, chest breathing.—**Peritonitis, Page 94.**

Shivering; pus coming to surface of udder; in some cases there is no pus but the udder gets hard; part of the udder may fall off in severe cases; milk streaked with blood; udder hot, swollen and tender.—**Garget, Page 79.**

Skin eruptions; unthrifty condition; coat rough; dullness; legs stocky; skin may be scaly.—**Bad Blood, Page 88.**

Sneezing; fever; cough; thin, watery discharge from the nose at first but this soon thickens; eyes inflamed and swollen; pulse full; bowels constipated; tips of horns and extremities of limbs cold.—**Catarrh, Page 80.**

Sound—rattling sound heard; breathing quickened; lying down; chill followed by fever which gradually increases for a time.—**Pneumonia, Page 95.**

Staggering and falling in partially unconscious condition; uneasiness; poor appetite; lessened secretions of milk; constipation, scanty urine.—**Milk Fever, Page 93.**

Staggering gait; nostrils, mouth and eyes reddened; muzzle and mouth dry; urine colored; pressure on abdomen causes pain; falling down and moaning; manure covered with slime; flanks heave.—**Inflammation of the Bowels, Page 89.**

Stiffness; swellings on affected part; these swellings emit a crackling sound when rubbed; high fever; poor appetite. When one of the swellings are opened a foul smelling, bloody fluid runs out.—**Anthrax, Page 75.**

Stopping; panting violently; losing consciousness and falling, breathing slow; pulse weak and irregular.—**Sunstroke, Page 97.**

Straining severely; high fever; walking slowly; great thirst; loss of appetite; back arched; tail elevated; bowels irregular; milk flow stops; breath and manure very offensive and streaked with blood.—**Dysentery, Page 82.**

Swallowing frequently attempted; saliva runs from mouth; neck arched; coughing; heavy breathing; poking out nose.—**Choking, Page 80.**

Sweating; poor appetite; colicky pains; high fever; frequent but scanty passage of urine which is dark and thick; moves hind quarters with difficulty; back arched; quick breathing; fast pulse.—**Inflammation of the Kidneys, Page 89.**

Swellings on affected part; the swellings emit a crackling sound when rubbed; high fever; poor appetite. When one of the swellings are opened, a foul smelling bloody fluid runs out; lameness; stiffness.—**Anthrax, Page 75.**

Swelling that is soft, coming at the navel; it is easily pushed back with the finger.—**Navel Rupture, Page 93.**

Swelling that is soft on belly, usually on the right side.—**Ventral Rupture, Page 96.**

Swollen red feet followed by blisters which burst and cause severe lameness; inclination to lie down; chill followed by fever.—**Foot and Mouth Disease, Page 84.**

Tail, switching; head thrown from side to side; kicking abdomen with hind feet; lying down often; moaning; grunting.—**Colic, Page 81.**

Tears and mucus discharged from eyes; strong light irritating; eyes red; lids swollen.—**Sore Eyes, Page 96.**

Teats will not pass milk.—**Stricture of the Teat.**

Teeth loose following lump on the jaw. This lump softens, breaks and throws out thick pus containing yellow masses of germs.—**Lump Jaw, Page 92.**

Thirst excessive loss of appetite; back arched; tail elevated; bowels irregular; milk flow stops; breath and manure very offensive and streaked with blood.—**Dysentery, Page 82.**

Ticks that are very small found on the thighs, forelegs and belly; extreme weakness; high fever; loss of appetite; bowels constipated; urine highly colored.—**Texas Fever, Page 97.**

Udder tender; swollen, hot; milk streaked with blood or curdled; dullness; fever; shivering; pus coming to surface of udder; in some cases there is no pus but the udder gets hard; part of udder may fall off in severe cases.—**Garget.**

Unconscious; falls down; breathing slow; pulse weak and irregular; stopping; panting violently.—**Sunstroke, Page 97.**

Uneasiness; poor appetite; lessened secretions of milk; constipation; scanty urine; gait staggering; falls down in partially unconscious condition.—**Milk Fever, Page 93.**

Urine colored; pressure on abdomen causes pain; falling down and moaning; manure covered with slime; flanks heave; gait staggering; nostrils, mouth and eyes reddened; muzzle and mouth dry.—**Inflammation of the Bowels, Page 89.**

Urine—frequent but scanty passage of urine that is dark and thick; moves hind quarters with difficulty; arched back; quick breathing; fast pulse; sweating; poor appetite; colicky pains, high fever.—**Inflammation of the Kidneys, Page 89.**

Urine scanty; staggering gait; falls down in partially unconscious condition; uneasiness; poor appetite; lessened secretions of milk.—**Milk Fever, Page 93.**

Urine very highly colored; very small ticks found on the thigh, forelegs and belly; extreme weakness; high fever; loss of appetite; bowels constipated.—**Texas Fever, Page 97.**

Uterus protruding through vagina.—**Eversion of the Womb, Page 84.**

Vagina has yellow sores on its lining; rope of mucus hanging from vulva.—**Abortion, Page 74.**

Water blisters on skin which leave the skin moist with their contents; sometimes swelling and large sores; severe itching.—**Eczema, Page 82.**

Weakness, extreme; high fever; loss of appetite; bowels constipated; urine very highly colored; very small ticks found on the thighs, forelegs and belly.—**Texas Fever, Page 97.**

Weakness of hind quarters before calving.—**Paralysis of Hind Quarters before Calving, Page 94.**

Worms coughed up; bowels loose; suffocating sort of breathing; cough dry and husky; poor appetite.—**Filaria Bronchitis.**

TREATMENT FOR DISEASES OF CATTLE

ANATOMY OF CATTLE.

While there is considerable difference in the bony construction of the ox and horse the bones and joints are known by the same names. The ribs of the horse are joined to the breast bone by cartilage while those of the ox are united by joints. The horse has eighteen pair of ribs and the ox has only thirteen pair. The breast bone of the horse is more round than that of the ox. When suffering from diseases of the lungs the ox usually lies down and the horse stands up, because he has more breathing capacity when standing and the ox has more when lying down. The ox has a divided foot and of course the bones are different than those in the foot of the horse.

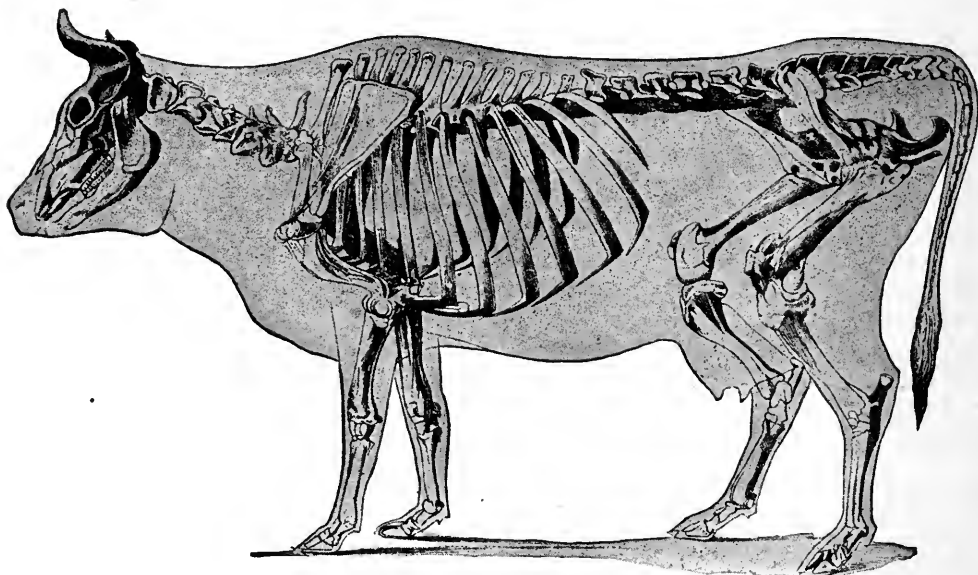
The Digestive Organs.—The digestive organs of the ox differ in some respects from those of the horse. The tongue is rough and thicker than that of the horse and is used to convey food to the mouth. The teeth differ very much from those of the horse. There are eight front teeth in the lower jaw but none in the upper jaw, their place being filled by a thick hard tissue which answers the purpose of teeth. This makes it difficult for cattle to thrive on short pasture. The molars (grinders) are quite similar to those of a horse. The palate of the ox is small and does not close the opening into the pharynx as does that of the horse. The pharynx is larger than in the horse. The fibers of the gullet have a double action. While the animal is eating, they carry the food from mouth to the stomach; while chewing the cud, they act in opposite way, carrying food from stomach to mouth.

The gullet thus carries the food from the stomach to the mouth and back to the stomach when masticated.

The stomach of the ox has four compartments: the first, called the rumen or paunch; the second, the reticulum; the third, the omasum, and the fourth, the true stomach or abomasum. The first three have an important part in the preparation of food for the fourth, or true stomach, where the greatest part of digestion takes place. The rumen or paunch is held in position by ligaments which attach it to the left side. It occupies a large space and is the organ operated on in tapping for bloat. The rumen has two openings on the front side. One for the food to enter and the other for its passage into the reticulum. The food enters the reticulum from the front and passes into the omasum from a back opening. From the omasum the food enters the true stomach, to be digested and passed into the small intestines.

Both the large and small intestines are similar to those of the horse, but are larger and longer and less liable to become diseased. When the food enters the intestines, it is acted upon by the bile secreted in the liver; the nourishment is carried into the blood and the balance is passed out as manure.

The gall bladder in the liver of the ox accumulates gall which is forced into the intestines during the process of digestion.



SKELETON OF THE COW

Some knowledge of the skeleton is advisable to facilitate the study of diseases of bones and the accidental injuries to which they are exposed. The skeleton of the adult ox is made up of the following number of bones:

Spinal column.....	45	Pelvis	2— 1 on each side.
Head	28	Thigh	2— 1 on each side.
Chest	27	Leg	6— 3 on each side.
Shoulder	2— 1 on each side.	Hind foot.....	38—19 on each side.
Arm	2— 1 on each side.		
Forearm.....	4— 2 on each side.	Total	196
Forefoot	40—20 on each side.		

Urinary Organs.—The bladder and urinary passage are much the same as in the horse, but the kidneys of the ox are larger.

Respiratory Organs.—The respiratory organs of the ox are not as susceptible to disease as those of the horse although they are much the same in construction. In the normal animal the heart beats from forty-eight to fifty-six times in a minute. The pulse may be taken on the under side of the lower jaw, taking the artery between the first and second fingers. The normal respiration is from ten to twenty per minute and is easily counted by watching the nostrils. The temperature in cattle is very important in ascertaining the presence of disease and every cattle owner should possess a clinical thermome-

ter. The temperature may be obtained by inserting the thermometer in the rectum for two or three minutes. In normal cattle it should register about 101 degrees. If very much above $101\frac{1}{2}$ the animal is considered feverish.

ACTION OF DRUGS IN CATTLE AND HORSES.

Certain remedies do not always affect cattle and horses the same way. Mustard acts better with cattle than horses but turpentine does not act as well. Oils make a good cathartic for horses, but melted lard is much better for cattle. It is generally better to dilute the drugs well that are to be given to cattle because of the great size of the stomach and the amount of food in it. Also cattle require nearly twice as much medicine as horses.

DRENCHING A COW.

It is quite a simple matter to drench a cow. Hold the animal's head high enough to form an incline for the medicine to run into the back of the mouth. Stand on the left side and hold the nostrils with the thumb and finger. The only thing left to do is to put the nozzle of the bottle into the mouth and let the medicine run down. Caution: Pour the medicine down slowly so that it will run into the fourth stomach where it should go.

BANDAGING AND STITCHING WOUNDS.

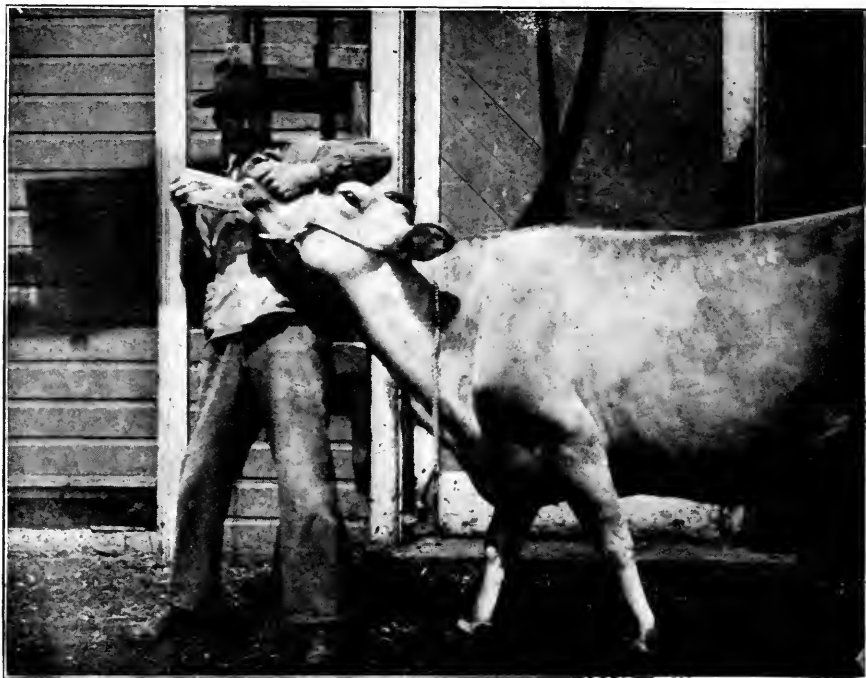
In some way, the edges of the wound must be brought together and kept there; in case it is on the legs, a bandage or strip of adhesive plaster applied smoothly around the leg may be sufficient to hold the wound together, if not, and stitches are required, a surgeon's needle having sharp edges and silk thread or catgut should be used. Bring the edges together as smoothly as possible by passing the needle through both edges of the wound. Do not draw the stitch too tight as a little swelling of the parts will cause them to tear. A small opening should be left near the bottom for pus to drain out. After the wound is sewed, it should be treated with antiseptics, and carefully protected from injury. If catgut is used in stitching it will absorb, but if thread is used the stitches may be removed in five or six days if the wound has done well. In treating wounds, see "Horse Department."

CASTRATION OF CALVES AND BULLS.

This operation consists in removing the reproductive organs. Calves should be thrown on their sides to be castrated, but a bull is usually castrated while standing. He should be fastened in by stocks or else tied to the wall and a stout post. His right side should be towards the wall. He can be held there by means of a surcingle around his body. Wash the scrotum, hands and knife in a carbolic acid solution (1 part to 30) before performing the operation. In this operation the testicles are forced low down in the sack with the left hand while a bold incision is made with the knife on the back side of the sack clear to the bottom. Draw one testicle down and cut

off the cord well up. Tie the end of the cord with silk or catgut or else use the ecraseur or emasculator. Be sure the string is long enough to be pulled off later.

The cord in calves can be cut off with a knife without danger. The parts should be washed thoroughly in peroxide of hydrogen or one part carbolic acid to thirty parts of water at least once a day until they are healed.



Drenching the Cow

DISEASES.

Explanation.—The subjects in this department are arranged in alphabetical order so as to help the reader find what he is looking for without even turning to the index. However, a complete index will be found at the back of the book.

Abortion.

Abortion is the expulsion of the immature young. It is more common in cattle but it occurs in other farm animals, especially where large numbers are kept together. Usually caused by copulation but may be transmitted from one cow to another. Some assert that consuming affected food or water is often the cause.

Symptoms.—In the early months there is usually no warning before an abortion has taken place. A sticky, rusty and odorless discharge a few days

before the abortion. Soon after a yellowish-gray discharge lasts for several weeks, also a rope of mucus often hangs from the vulva.

Treatment.—The treatment can be very little aside from good care and sanitary measures. To prevent the bull from carrying the infection, clip the hair from the opening of the sheath. Disinfect the parts with $\frac{1}{2}$ percent of compound cresol solution or lysol. Irrigate the uterus of the cow daily with the same solution. Remove diseased animal from the herd. Do not breed her again for two months. Use antiseptics, taking precautions against breeding to infected animals, and keeping the stock in good vigorous condition. A cow that has aborted should not be bred for some time after all discharge has ceased. For two days before breeding wash out the vagina with a solution of corrosive sublimate (4 drops to a teacupful of water). On the day of breeding use warm water instead of the solution, as the latter will destroy the semen.

Home Prevention for Abortion.—Mix ten pounds of salt, one pound of sulphur and one pound of powdered hyposulphite of soda. Give a medium handful about three times each week to pregnant cows.

(Also See "Horse Department," Page 152.)

Afterbirth, Retained.

This occurs because of inflammation of the womb; lack of preparation because of abortion; imperfect power of contraction; innutritious food; rapid closure after calving; a too prompt milking by attendant or sucking by the calf.

Symptoms.—Membranes hang from vulva and decay, causing offensive odor; ill health; drying up of the milk; wasting away in flesh.

Treatment.—If the cow is in low condition or the cause is connected with food, give hot drinks and hot mashes of wheat bran. If besides the above conditions the bowels are tight, give an ounce of ground ginger, or $1\frac{1}{2}$ pound of Glauber's salt in 4 quarts of warm water, or half an ounce of black pepper given with a quart of sweet oil. Give one or two quarts of boiled flaxseed tea frequently. Seize the dependent part of the afterbirth between two sticks, roll it on them until they lie against the vulva, by careful drawing and moving from side to side the afterbirth is wound up until finally its last connections are severed. Do not neglect attending to this removal.

Anthrax.—(See "Sheep Department," Page 203.)

Barrenness in Cows and Bulls.—(See "Horse Department," Page 152.)

Black Leg.

This is a contagious disease usually affecting young cattle. Germs entering through some abrasion in the skin while the animal is on pasture, or taken into the body with the drinking water or with the food. It seems to affect calves that are in good flesh rather than those that are thin.

Symptoms.—Lying apart from other stock, lameness, stiffness, swellings on affected part, which swellings are full of gas and emit a crackling sound if rubbed; high fever, poor appetite. When one of the swellings is opened a foul smelling fluid runs out, which is often streaked with blood.

Treatment.—Animals with black leg generally live several days, but few recover. Put the well calves on new uninfected pasture or barns and give uninfected water. This is a reliable and safe preventive and should be done before the trouble occurs, if there is black leg in the country.

Dissolve a scant teacupful of Glauber's salt and one-half to two-thirds teacupful of table salt in a quart of water. Give this dose again from 4 to 6 hours and once a day for several days. This is one of the most effective remedies known.

Prevention for Black Leg.—A safe and reliable prevention is to vaccinate with a good black leg virus.

Take three pounds each of air-slaked lime and saltpeter, six pounds of sulphate of iron and ten pounds of sulphur, pulverize and mix thoroughly. Instead of feeding salt alone, use a pound of this mixture to a gallon of salt. This medicine is used to prevent black leg in many parts of the West.

Bleeding.

Slight hemorrhages may be stopped by the continual application of ice, snow or cold water to the wound. Lint or sponges may be forced into a wound and held with bandages. Tie a piece of string tight around the end of a cut artery. When necessary saturate a bandage in vinegar or alum and apply tightly to the wound.

Blind Stagers.—(See "Horse Department," Page 158.)

Bloat.

Bloat means an enlarged condition of the paunch caused by being filled with gases of fermentation. Green food, choking, acute indigestion, gases in the digestive tract are the causes of bloat.

Symptoms.—The animal has an anxious expression, moves uneasily and is evidently distressed. Drum-like sounds are made when the fingers are snapped against the left flank. The animal moves slowly, breathes with difficulty, often emits a grunt or moan as it breathes. There is a dripping of saliva from mouth, colicky pains are shown by kicking at belly or stepping about uneasily. The animal may stagger and fall as bloating increases and die if not relieved.

Treatment.—In a light case of bloat no medicine may be needed; it may be sufficient to walk the animal around for half an hour. When the life of the animal is in danger, tapping should be resorted to since there is little danger from this operation. This should be done, if the flank is drum-like, in order to let the gas escape. After medicine is used the bowels should be opened by injections of warm soapy water.

In moderate cases give adult cattle two-ounce doses of aromatic spirits of ammonia or dissolve half an ounce of chloride of lime in a pint of warm water and give as a dose. Repeat every half hour until relieved.

Dash cold water against animal's sides until relieved. A prominent farmer writes that covering the animal with wet cold blankets and changing them often brings relief.



Tapping the Paunch of the Cow for Bloat

Be sure to tap on the left side and as near a point midway between the last rib and the point of the hip as it is possible to determine.

Arrange the animal's front feet about a foot higher than the hind feet. This allows the gas to escape.

A good remedy for bloat is two tablespoonfuls of common baking soda given in water as a drench.

Give heaping tablespoonful doses of finely pulverized charcoal in $\frac{1}{4}$ gallon of water as a drench.

The gas may often be started by putting red or black pepper on the animal's upper lip. This causes him to run out the tongue.

Pull the tongue out of one side of the mouth and throw a small handful of salt well toward the back part before loosening the tongue. The cow will then work the tongue and stimulate the flow of saliva which promotes the gulping up of gas. This will often work better if the mouth is bitted open.

An excellent remedy is to tie a piece of tarred rope through the mouth and back of the horns.

Hold the mouth open by putting a stick about the size of a fork handle through it. Tie this in place with a rope around the horns. Daub some pine tar on this stick if you have it. If the bloat is not relieved tap the animal.

Give one tablespoonful of baking soda and two tablespoonfuls of salt in a quart of warm water as a drench. If bloat is reduced give from one to two pounds of Epsom salts.

Tapping should always be done when the medicines do not give relief and the paunch becomes drum-like. Tie the animal's head securely if possible and wash the part where the body is to be tapped, with any good disinfectant. Make a small incision through the skin over the most prominent part of the swelling on the **left** side about midway between the last rib and the point of the hip, to admit the trocar. Push the trocar in boldly in a downward and forward direction and you will not fail to tap the paunch. Remove the trocar and leave the canula until the gas escapes. If the food clogs up the canula, push the trocar in again to clear it out. In some cases it may be necessary to remove both the trocar and canula and plunge them in again in a different direction, using the same hole in the skin. It may be even better to perform the operation in a different spot. Give the animal one pound of Glauber's salts after the operation to avoid constipation.

In case the paunch becomes drum-like and you have no trocar and canula do not desist to tap the animal with a small bladed knife. Make the incision on the left side at the most prominent part which is usually half way between the last rib and point of the hip. Direct the blade downward to avoid making too large a cut if the cow jumps. Insert a quill or clean pipe stem into the opening to allow the gas to escape. If the gas does not escape tap again.

Blocked Teats or Stricture of the Teats.

This often happens to cows. It is caused by some irritant inside the teat, injuries, a growth inside the teat blocking the passage or unhealthy condition of the glands.

Treatment.—When the trouble is caused by a growth it may often be removed by looping a fine spring passed as a loop through a fine tube and insert into the teat.

If an application of iodine is put on the teat once a day it will often remove the trouble.

Blood Letting.

Blood letting is not practiced any more by the most enlightened people except in the most extreme cases and then only when everything else has failed.

Blood Poisoning.

Germs entering the body through open sores, or some poisonous matter entering the system.

Symptoms.—Loss of appetite, fever, fast, quick breathing, and sometimes delirium.

Treatment.—Take care of the animal immediately. See if there is an abscess causing the trouble.

If an abscess has formed apply peroxide of hydrogen (1 part to 2 of water) after breaking the abscess. Then apply a carbolic acid solution (1 teaspoonful to a cup of water). Use this treatment several times daily and give a good tonic three to five times a day. Watch the bowels and give a good cathartic when necessary.

Bloody Milk.

Symptoms.—Injuries, excitement caused from heat, circulation increased by more abundant food than usual, tumors in the udder, eating of logwood or madder, all may cause blood in the milk.

Treatment.—Study out the cause and remove it. See that the animal has proper bedding.

Bathe the bag in hot or cold water and rub with camphorated lard. Reduce the feed if it is too rich or abundant.

Mix one part of iodine ointment to two parts of soft soap, and rub the bag frequently with this mixture.

Breathing in Young Calves—(How to Start).

Clear the mouth and nose, and remove the membranes, then start the calf to breathing. To do this press the chest in and out gently or blow into the nostrils.

Bronchitis.

Inflammation of the mucous membrane of the bronchial tubes is a common disease with domestic animals. The usual causes are: exposure to cold and dampness, it sometimes follows sore throat, breathing irritating gases, etc.

Symptoms.—Bronchitis often starts with a chill and is followed with fever. The pulse is hard and rapid; the cough short, dry and husky; the bowels are constipated; loss of appetite.

Treatment.—Supply fresh air but avoid drafts. Keep the contents of the bowels in a soft condition by enemas. Keep the body warm by blanketing. In the early stages give a solution consisting of 4 fluid ounces acetate of ammonium, 2 drams extract of belladonna and $\frac{1}{2}$ pint water. Give this three times daily.

Make a paste of mustard and lard and apply to the chest, the lower part of the neck, and the sides.

Put one tablespoonful of carbolic acid in a bucket of hot water and let the animal inhale the fumes. Repeat every hour.

Give injections of soapy water to open the bowels. Violent purgatives should never be given.

Buffalo Gnat.

These are known also as black flies, they have a humped back and are about one-eighth of an inch long. They breed in running water. Their bite is poisonous and causes heavy losses.

Treatment.—Burning of smudges often keeps them away. They appear more on sunny days. Cattle will not be molested when in darkened stables. Use repellant as shown under flies.

Capped Elbow.—(See "Horse Department," Page 175.)

Catarrh.

This is an inflammation of the mucous membranes of the nose and parts of the head. It often affects the eyes and throat by making them red and watery.

Damp stables, exposure to sudden changes of weather, especially when wet and cold, inhalation of irritating gases, are some of the causes.

Symptoms.—Often some fever and cough; discharge from the nose that is watery at first but soon thickens; eyes inflamed and swollen; constipated, poor appetite; tips of horns and ears have variable temperature.

Treatment.—Take good care of the animal. Give him a roomy dry stable. Feed laxative foods. In severe cases hot medicated inhalations may be given. Give the animal about one pound of Glauber's salt to loosen the bowels. Repeat this dose in 24 hours if necessary. Give from one to two ounces nitrate of potassium in the drinking water three times daily. This is to reduce the fever.

Chapped Teats.

Contact with cold water; sudden chilling in winter; anything which irritates them will cause them to become chapped.

Treatment.—Applications of vaseline are very good. A mixture of equal parts of oil of sweet almonds and spermaceti may be applied producing excellent results. If very severe, wash with a solution of one dram sugar of lead in one pint of water, then apply benzoated zinc-oxide ointment. Equal parts of sweet oil and belladonna rubbed on after milking is an excellent remedy.

Choking.

This is caused by attempting to swallow too large an object such as a beet, potato, pear, apple or turnip. Sometimes caused by bolting dry food.

Symptoms.—Animal coughs frequently; saliva discharges from the mouth; after drinking, the water is soon ejected; the expression is troubled; breathes fast and sometimes there is bloating.

Treatment.—Remove the object by pressing it up if possible. To assist this give the animal a half pint of raw linseed or olive oil before doing as above stated. A well wrapped, twisted wire, a piece of thin garden hose or a piece of new rope with the end closely wrapped, waxed, and oiled, may be used in emergencies, as a probang. Also the end of a tug may be used.

Tobacco formed into a ball half the size of a man's fist and forced down the cow's throat as far as possible, will often make the animal sick and cause it to throw up. This will relax the muscles of the throat and throw the object out.

Add a little sweet oil to a strong soap suds. Pour this down the animals throat and work the object loose with the hands.

Cold water poured in the animal's ear is often effective. This causes the animal to shake the head violently and thus dislodge the object. This is more applicable to a horse than a cow, writes a prominent Michigan farmer. Throw a handful of salt into the animal's throat. Put a small handful of gunpowder on the back of the tongue. This oils the passage and helps loosen the obstacle.

Colic.

Produced by drinking too freely of cold water, which brings on cramps of the stomach and bowels and stops digestion.

Symptoms.—Distension of the abdomen but no gas. Animal is nervous and restless. Often seized with a fit of trembling or a chill. The distention and pain occur immediately after the animal has drunk the water.

Treatment.—Walk the animal about for ten minutes. Then give a tablespoonful of powdered ginger in a pint of warm water. Put two tablespoonfuls of spirits of camphor in a pint of warm water and give as a drench.

Constipation.

This is more a symptom of disease or of faults in feeding than a disease itself. It occurs most generally in fevers, from feeding on bulky or dry food, and from obstructions of all kinds.

Symptoms.—Animal's nose is dry, lack of interest in feeding, manure usually dry.

Treatment.—Remove the cause which gives rise to constipation. Then give purgatives in repeated small doses instead of one or two large doses. Flaxseed is a fine feed laxative. Give the animal plenty of salt. An enema of soapsuds and warm water is good.

Constipation in New Born Calves.

At birth the calf's bowels contain a sticky, brownish-yellow material partially derived from the liver. Before they start their normal functions this must be expelled. The cow's first milk is nature's remedy to expel this material.

Treatment.—Give the calf a one-ounce dose of castor oil and inject soapsuds. Give the cow a sloppy, laxative diet.

Cornstalk Disease.

Can be found in Central and Western states. It is caused by poisoning from cornstalks; sometimes from too much bulky food. Young cattle are the most easily affected, especially in wet weather.

Symptoms.—Moaning and bellowing; actions denoting delirium, avoidance of the other cattle.

Preventive Treatment.—Feed and water the cattle well before turning them out into the field at first. Leave them in the cornfield but half an hour the first day. Give laxative foods and salt regularly. Drench with strong tansy tea to affect a cure, writes a Missouri farmer.

Cow Pox.

This is a contagious inflammation of the udder and usually spreads from animal to animal by the hands of the milker. Sometimes it affects the legs or heels of the horse and is thus transmitted to the cows.

Symptoms.—Cow has slight fever. Tenderness of the teats is usually noticed first, and pale-red bunches appear. These grow from the size of a pea to nearly an inch in diameter. The yield of milk lessens. Blisters form in about ten days and soon become yellow from containing pus. Milking causes raw sores instead of blisters.

Treatment.—Heal the sores. Milk gently using teat tube or dilator if necessary. Wash the teats in a solution of half an ounce hyposulphite of soda in a pint of water.

Dehorning Calves.

Apply caustic potash to the horns when they start if you would kill them. (See page 43.)

Dysentery—Chronic.

This word as commonly used signifies a severe form of diarrhea. It is a symptom of irritation of the intestines causing increased muscular contractions or secretions. Sometimes the result of improper feeding, chilling or parasites.

Symptoms.—Passages from bowels are frequent, consisting of watery and offensive dung which may be streaked with blood. The animal becomes weak and restless, lies down and shows evidence of abdominal pain. Sometimes loss of flesh and strength quickly results.

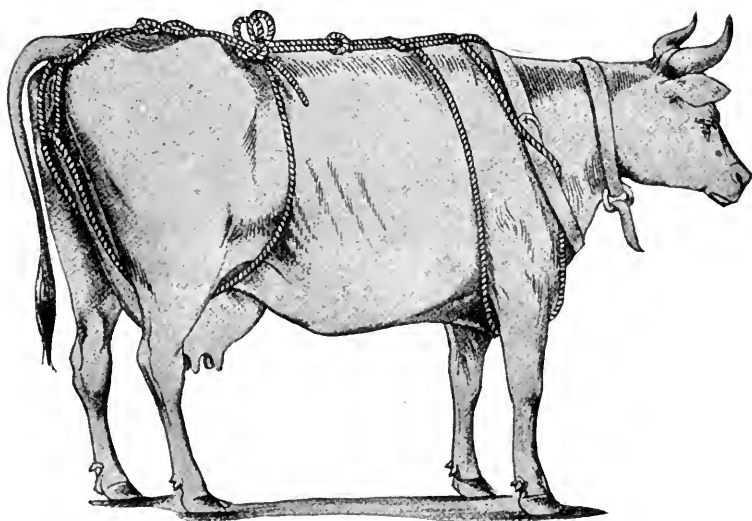
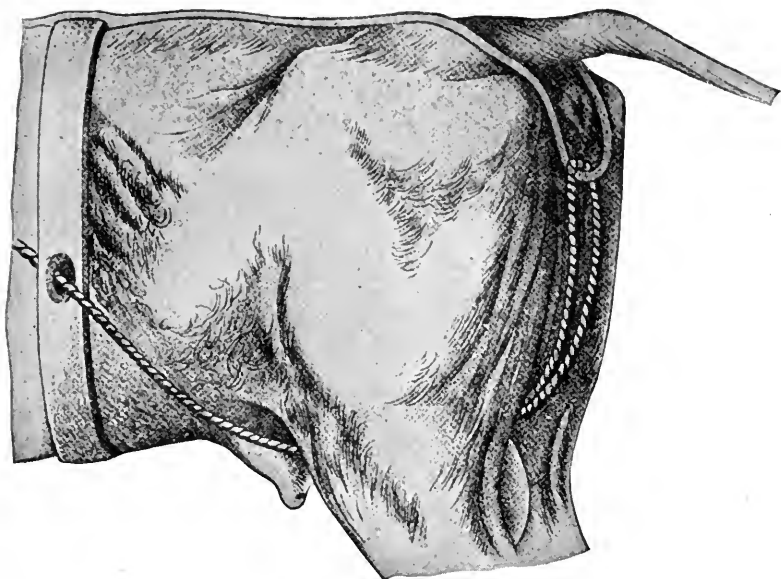
Treatment.—If caused by irritating properties, give a pint of castor oil or raw linseed oil. When there is lack of appetite but no fever, mix two ounces of powdered gentian and one ounce Tannic acid and give one-twelfth three times a day until normal appearance is shown. Parched rye flour, strong coffee, raw eggs or a tea from oak bark are excellent remedies for this disease.

Eczema.

This is a noncontagious inflammation of the skin, caused by filthiness, overfeeding, overcrowding, or stables which are too damp or excessively warm.



Chronic Dysentery



Supports for Prolapsed Uterus in Eversion of the Womb

Symptoms.—Swelling and increased heat of the skin, small rounded elevations containing a water fluid. Water disappears and crust forms. Skin becomes red and thickens, crust peels off. Animal keeps parts raw by rubbing.

Treatment.—Feed moderately such feeds as ground oats, clean hay, bran mash, green feed and plenty of salt. Give half an ounce of acetate of potassium twice a day. Give Epsom salts if a purgative is needed. If animal is poor give a tablespoonful of the following mixture in feed twice a day: Sulphur, gentian, powdered copperas and sassafras bark, equal parts by weight. Be careful the animal does not have lice.

Eversion of the Womb.

This is failure of the womb to contract after calving.

Symptoms.—The womb is distinguished by from 50 to 100 mushroom-like bodies, each 2 or 3 inches in diameter, clustering on its sides.

Treatment.—Treat the case promptly. In partial eversion, have an assistant pinch the back to prevent straining while the operator pushes the mass back through the vagina with his closed fist. In complete eversion, with the womb of its natural bulk and cow standing, pinch the back as before mentioned, have two men to hold a sheet to sustain the womb and raise it to the level of the vulva. Sponge clean with cold water; this reduces the bulk and drives out the blood. Plant the closed fist in the rounded end of the largest horn and push, turning it back within itself and carrying it on through the vagina. Use the other hand to assist in the inversion. Retain the returned womb by tying a strap or rope around the neck and a surcingle around the body. Make a rope truss from two ropes each about 18 feet long and one inch thick. Double each rope at its middle, and lay one above the other at the bend so as to form an egg-shaped loop about 8 inches in its long diameter. Twist each end of the one rope twice around the other so this loop will remain when drawn tight. Place the rope truss so the loop will surround the vulva. The two descending ropes are carried forward on the sides of the animal and tied to the surcingle and neck collar. Twist the other ropes and proceed forward on the cow's back tying them to the surcingle and collar. The rope ring should press firmly around the vulva. See that this is worn for several days.

Foot and Mouth Disease.

This disease is highly infectious and attacks cloven footed animals chiefly. It affects the mouth, between the toes and above the hoofs. Every outbreak starts from a previous outbreak.

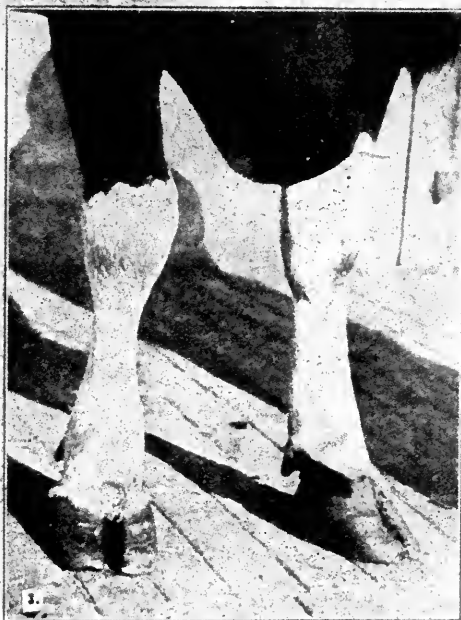
Symptoms.—There is tenderness of affected parts, lameness, loss of appetite, and the quantity of milk diminishes. The animal opens and closes its mouth with a smacking sound and ropy saliva soon hangs from the lips.



1. Discharge From the Mouth and Nostrils



2. Sores on the Bag



3. Sores Between and Above the Cleft in the Hoof

FOOT-AND-MOUTH DISEASE

Treatment.—Keep healthy animals of all kinds away from infected cattle. Keep people connected with other animals away from the premises. While the affected cattle may recover in a few weeks, the virus may be carried on them and the disease thus spread. Get rid of all cattle that have had the disease. Disinfect with any of the following solutions: A 5 percent solution of pure carbolic acid; standard chloride of lime, 1 pound to 3 gallons of water; formaldehyde, 1 quart 40 percent solution to 5 gallons of water; or a 3 percent solution of cresol compound. Burn the manure and plow under. Do not purchase other cattle for at least 60 days after disinfection.

Flies—Keeping Them Off Stock.

The following is said to protect cows for a week: One pound common laundry soap, 4 gallons water, 1 gallon crude petroleum, 4 ounces powdered naphthalin. Cut the soap into thin shavings and dissolve in warm water; then dissolve the naphthalin in the crude oil and mix the two solutions thoroughly. Stir well before using and apply with a brush, or use 1 pound rancid lard and one-half pint kerosene. Mix into a creamy mass. Recommended by Minnesota Experiment Station. A mixture of cottonseed oil and pine tar has produced excellent results. Use every day or two.

Frost Bites.

A day or two after freezing, the ear becomes swollen and painful. The dead part is cold and begins to shrivel. Mix one part each of turpentine, ammonia and chloroform, then add six parts of sweet oil. Rub this on affected part. It relieves pain and stimulates the circulation.

Grubs in the Back.

These grubs develop from the eggs of the heel fly or warble fly. The fly resembles a small black bee. It appears early in summer and lays its eggs on the skin of cattle. The usual mode of entrance is through the skin, although the eggs or newly-hatch larvae may be taken into the mouth by the cattle licking themselves.

Symptoms.—Conspicuous lumps form during the latter part of winter and spring.

Treatment.—When the grubs have reached a late stage of development they may be squeezed out and killed. When lumps are small, cut with a sharp knife and press out the grub. You can kill the grubs by forcing grease or oil into the openings of the lumps. The only objection is that the dead grubs remain beneath the skin.

Impaction of the Omasum or Third Stomach.

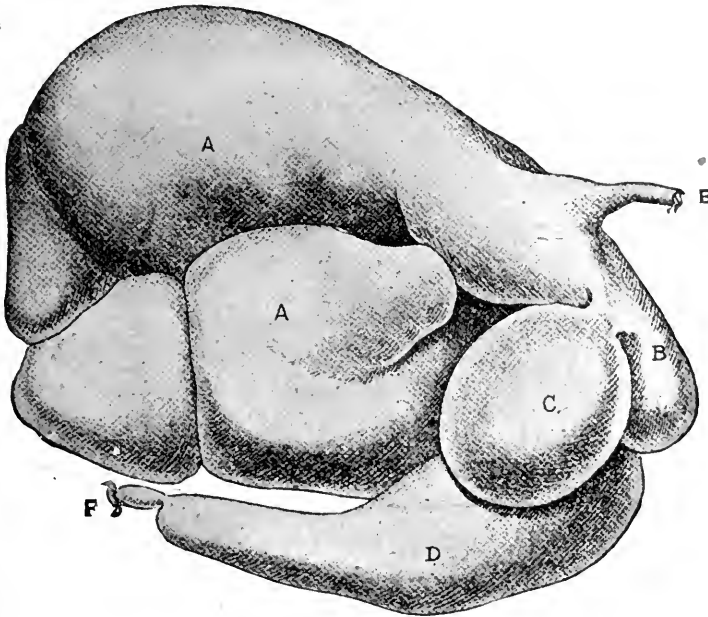
This is caused by food clogged in third stomach resulting from eating a lot of old dead hay in summer or extra dry feed in winter.

Symptoms.—There are sharp pains on right side and the animal has considerable fever. No bloating is usually shown, animal does not like

to move and keeps looking toward the right side. Below the ribs on right side a hard substance can be felt. Delirium often sets in.

Treatment.—Give a drench consisting of two ounces of ginger and one and one-half pounds of Glauber's salts. Twelve hours after the bowels have moved feed moist mashes or gruels and keep this up for several days at regular intervals.

To insure bowel movement, give one quart of linseed oil or one quart melted lard after twelve hours.



STOMACHS OF COW

- A. Rumen or First Stomach.
- B. Reticulum or Second Stomach.
- C. Omasum or Third Stomach.
- D. Abomasum or Fourth Stomach.
- E. Esophagus or Gullet.
- F. Opening from Fourth Stomach to Small Intestines.

On being swallowed the food passes into the first (A) stomach from the gullet (E). In (A) and (B) a churning motion is kept up which keeps the food passing from stomach to stomach. From (A) the food is returned to the mouth through (E) for rechewing before it is finally passed on to the third and fourth stomachs, and the small intestines.

Impaction of the Rumen.

This often happens after heavy meals which remain in the stomach undigested, often causing temporary paralysis.

Symptoms.—The animal is greatly distressed. It breathes as though it was suffocating. Fever develops. The animal moans frequently. The bowels are bound and the manure is foul smelling.

Treatment.—A drench consisting of $2\frac{1}{2}$ ounces of ginger and one pound of Glauber's salts often gives relief. Raw linseed oil is also good. When paralysis has actually occurred, the operation termed rumenotomy must be performed. This is an operation for the removal of the contents of the paunch through the side. Cut into the paunch on the left side and remove a large part of the contents with the hand. The incision should be made up and down midway between last rib and point of hip. The incision should not be more than six inches in length. Cleanse the parts well and sew up with catgut. Be careful about feeding anything but nourishing slops for eight or ten days. Animals have often recovered from this operation, when a common jackknife was used, but get a surgeon if there is time.

Impure Blood.

This is often caused by overfeeding, lack of exercise, damp stables and poor care.

Symptoms.—Eruptions or scaly condition of skin. Animal is not thriving. It has a dull eye and appears listless.

Treatment.—Cleanse out the system with a good cathartic. Charcoal or sulphur will purify the blood. Give lots of exercise and plenty of salt.

Indigestion.

Irritating or damaged feed, overloading of stomach, lack of exercise, deficiency of water or sudden changes of diet causes indigestion.

Symptoms.—Tongue coated, diminished appetite, mouth slimy, dullness, fullness of flanks and dung showing undigested matter.

Treatment.—Give sweet silage, roots, or selected hay several times each day in small quantities. Feed sparingly. Dissolve one pound of Glauber's salts in a pint of molasses and a quart of linseed tea. Diet should be laxative; avoid ice water.

Indigestion in Calves.

Indigestion is caused by the milk being too rich or too plentiful; constipation; allowing a calf to suck the first milk of a cow that has been violently excited; too long between meals; feeding fermented or spoiled milk; keeping calves in dark, bad smelling pens.

Symptoms.—Dullness, uneasiness, sour breath, loss of appetite, indisposition to move or lying down and rising as if in pain, and fullness of stomach. Diarrhea may carry off the offensive matters and restore health, or the bowels may become inflamed, fever set in and the calf die.

Treatment.—Prevent the causes mentioned above. Remove the irritant by giving castor oil, about 2 ounces at a dose. Then at each feeding give 30 grains of pepsin and a teaspoonful of tincture of gentian. Injections of warm soapy water will help.

Enteritis—Inflammation of the Bowels.

This may follow severe indigestion, or it may be caused by swallowing irritant poisons. The disease may be produced by exposure to cold or inclement weather.

Symptoms.—Drooping of the ears, dullness, dry skin, rough coat, dryness of muzzle, loins sensitive, fullness of left flank caused by distention of fourth stomach by gas, loss of appetite, pulse weak, animal staggers and grunts. Passages few at first and often coated with blood. Later a severe diarrhea begins and passages have an offensive odor. Animal has colicky pain which may continue. Fever occurs, there is general depression and insensibility before death. The disease is often fatal. After death the walls of the stomach are thick and soft and often show ulcerations.

Treatment.—Feed selected food carefully. Do not force the appetite. Protect from cold and dampness. Give boiled milk, rice water, boiled oatmeal gruel, or linseed tea. Subnitrate of bismuth in 2 teaspoonful doses is good, as is also $\frac{1}{2}$ to one teaspoonful dose of Tannopin.

Inflammation of the Fourth Stomach.

This results from the presence of a foreign body in the stomach. The animals often swallow their food without chewing it carefully, thus undigestible objects may be swallowed. Calves often get this disease by eating frozen or decomposed food.

Symptoms.—Grunting and pain upon sudden motion, coughing, pain on pressure over the second stomach.

Treatment.—If the presence of a foreign body is recognized, the animal may be killed for beef if there is no fever. Give a good dose of Glauber's salts and two ounces of ginger in warm water. Raw linseed oil is also good. Feed easily digested foods.

Inflammation of the Kidneys.

Eating irritating plants, exposure to wet and cold, stone or gravel in the kidneys, injuries to the back or loins, drinking alkaline or stagnant water, consumption of musty fodder, are all causes of this disease.

Symptoms.—Hurried breathing, rising temperature, fever, dry, hot muzzle, loss of appetite, sensitiveness in the loins, suspended chewing of cud, burning at the roots of the ears and horns, back arched, hind legs extended backward and outward, passes thick highly colored water frequently in dribbles, hesitates and groans when moved, are all symptoms of this disease.

Treatment.—Remove the cause if possible. Acrid plants may be removed from stomach by doses of olive or castor oil. Warm blankets or mustard poultices over the loins are important. Check the fever by 15 drops of tincture of aconite, or one-third ounce of acetanolid every four hours. As the disease lessens in severity give 2 teaspoonfuls of quinine or 4 teaspoonfuls of gentian powder daily as a tonic. Warm drinks are preferable. In its

chronic form give a tonic daily consisting of 2 drams phosphate of iron, 20 grains powdered nux vomica and 4 drams powdered gentian root.

Caution: Blisters of Spanish flies, turpentine or other agent that may be absorbed and irritate the kidneys must be avoided.

Inflammation of the Liver.

This usually occurs as a complication of some infectious disease. It also occurs from fermented or putrid feeds or from overheating.

Symptoms.—Yellowness of the white of the eye and the lining of the mouth; appetite is poor; the urine comes often and is very dark; pain is caused by pressing over the liver; the dung is light colored. Animal lies down often and rests its head on the side of its chest.

Treatment.—Give Glauber's salts to cause a good bowel movement. After it has operated, give a heaping tablespoonful of artificial Carlsbad salt in the feed three times each day.

Inflammation of the Udder.

Blows on the udder, exposure to wet or cold, congestion, overfeeding on rich albuminous feed like peas, beans or cotton seed, sore teats, insufficient stripping of the udder in milking, are causes of the trouble.

Symptoms.—Following exposure, the animal shivers, with general erection of hair and cold extremities. Then there is a reaction in which the horns, ears and limbs become very warm and the glands swell up. In other cases shivering is not noticed but tenderness of the bag, heat and the firm swelling are first observed; animal straddles with its hind limbs and lies down on the unaffected side if at all.

Treatment.—If the animal is shivering, drench with plenty of warm water and give warm injections. Wring a blanket out of hot water and place on animal, or place bags loosely filled with hot salt, sand or chaff on the loins and back. Give one ounce of ground ginger to help shorten the attack. Sweat the animal for half an hour, rub it well and cover with a dry blanket. If there is little or no fever and but slight inflammation, rub briskly with a weak iodine ointment or camphorated ointment and milk gently from 3 to 6 times a day. Each time the bag should be rubbed thoroughly. Where fever and inflammation are more advanced, give 2 pounds of Glauber's salts, and 1 ounce of saltpeter.

Insect and Snake Bites.

The poison injected by bites of certain poisonous insects and snakes under the skin of animals is a very powerful agent. It usually produces serious local irritation, oftentimes causing death. It does so by checking the heart action through narcotic influence and through diffused inflammation.

Symptoms.—Local swellings, pricks, depression, weakness, feeble pulse, difficult breathing, stupor or convulsions.

Treatment.—It may be local or general. First make every attempt to prevent absorption of the poison. If found immediately, cut out the bitten

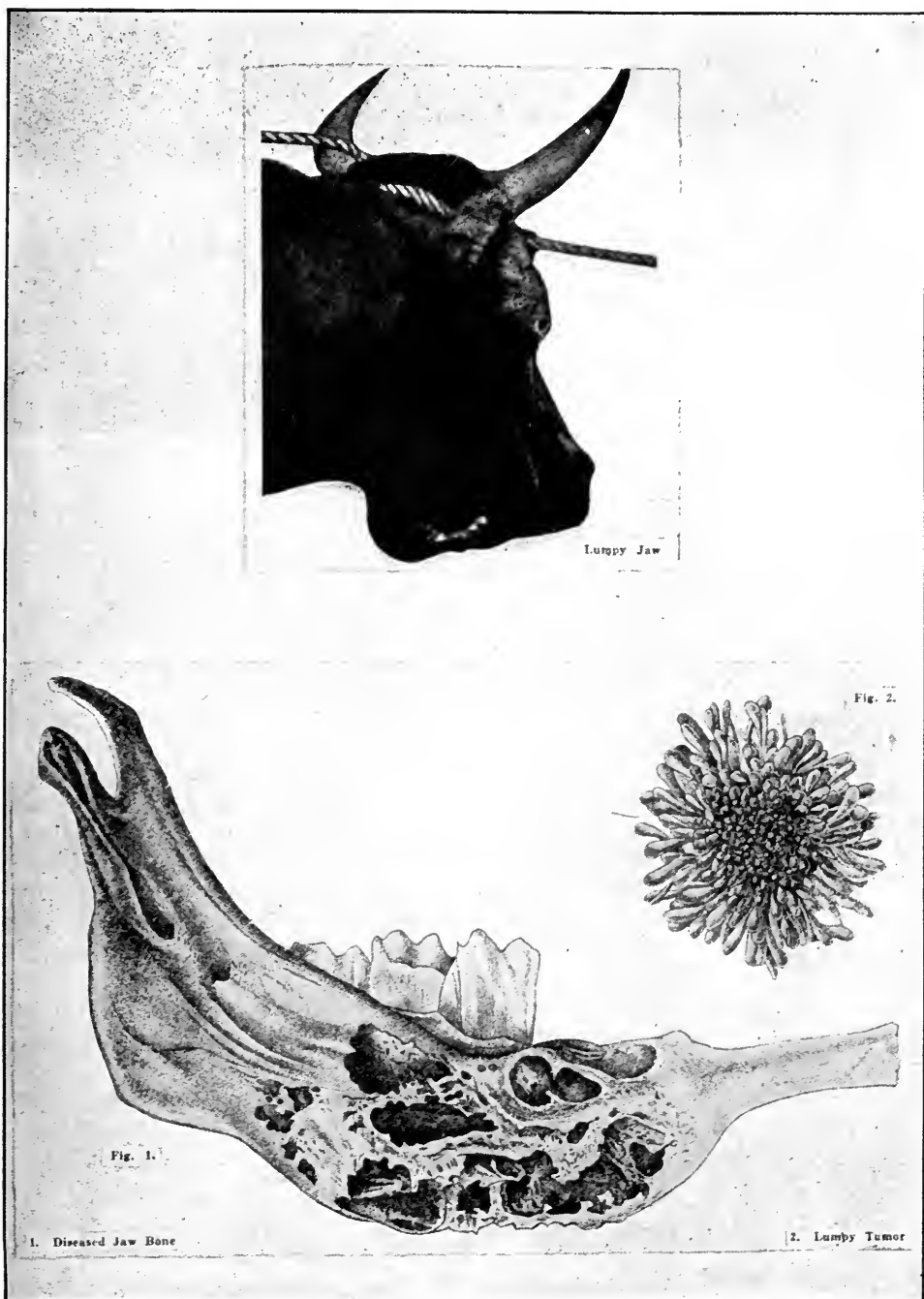


Fig. 3. Lumpy Jaw.

Fig. 2. Lumpy Tumor.

Fig. 1. Diseased Jaw Bone.

part. At least run a stick through a rope tied about the limb affected and twist it tight to stop circulation in the bitten part. Enable the wound to bleed freely. Squeeze out the poison with the fingers. Permanganate of potassium in 5 percent solution should be applied to and injected into the wound. Drench with stimulants such as Jamaica ginger, coffee, digitalis, or aromatic spirits of ammonia.

Lice.

Cattle lice fasten their eggs or nits to the hair. Infested animals rub against trees, posts, etc., and lick themselves. Mange is often suspected by the hair coming out and the skin becoming thick.

Treatment.—Mix one-half pint kerosene and one pound lard, then smear it on the body. A good home-made nicotine dip is prepared as follows: for each 18 gallons of dip desired take 4 pounds of good prepared tobacco leaves, soak them in luke-warm water for 24 hours in a covered container; then for a moment bring the water to the boiling point and let it stand over night. Strain and dilute with water.

Locked Jaw or Tetanus.—(See "Horse Department," Page 169).

Loco Disease.—(See "Horse Department," Page 169).

Lump Jaw.

This is a chronic infectious disease that chiefly attacks the lower and upper jaw. It may also appear under the skin in different parts of the body. It is conveyed into the tissues through decayed teeth, slight wounds, or shedding of the milk teeth.

Symptoms.—A large swelling appears, in which one or more smaller peculiar tumors are formed. These tumors vary from the size of a nut to that of an egg. These break through the skin as reddish, small, fungus-like bodies. Or sometimes the original swelling changes into an abscess which finally discharges creamy pus, the abscess cavity soon filling with fungus-like growths. The disease may start in the marrow of the bone or on the covering of the bone.

Treatment.—Give $1\frac{1}{2}$ or $2\frac{1}{2}$ teaspoonfuls of iodide of potassium once each day. This should be dissolved in water and administered as a drench. Vary the dose according to the size of the animal and the effect produced. Iodism appears in course of ten days if the dose is large enough. There is loss of appetite, weeping from the eyes and the skin becomes scurvy. When these symptoms appear, stop the medicine for a few days and then resume. Do not give iodide of potassium to milch cows. It decreases and spoils the flow of milk. If given to an animal in advanced pregnancy, it may produce abortion.

Lung Worms in Calves.—(See "Sheep Department," Page 208).

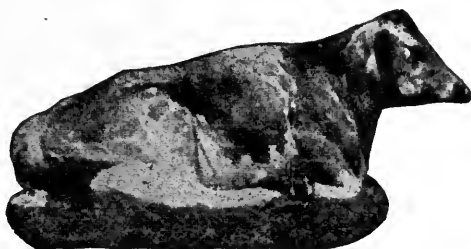
Maggots in Wounds and Screw Worms.—(See "Horse Department," Page 175).

Mange.—(See "Horse Department," Page 170).

Milk Fever.

This disease is most prevalent among plethoric cows or those having excessive fullness of the blood vessels. It occurs only at or near the time of calving.

Symptoms.—Sudden loss of voluntary movement and sensations, showing collapse of nervous power. In the congestive form the cow droops the head, shows uneasiness, sudden dullness, staggers, eyes appear red and pupils are dilated, no longer notices feed or calf, unable to rise after lying down, her nose often resting on the right flank. Pulse is high and she struggles convulsively.



Milk Fever

Treatment.—The distention of the udder with common air has proved invariably successful in all kinds of cases. It is best to have on hand an elastic rubber ball such as the common Davidson syringe with tubes. Into the free end of the delivery tubes fit a milking tube. Before using, sterilize by boiling the entire apparatus for 30 minutes. Use warm soap suds to wash the teats and udder, rinse with a 5 percent solution of carbolic acid. Insert the end of the tube into the teat and fill as full of air as it will hold. After withdrawing the tube, tie a broad tape around the end of the teat to prevent escape of the air. In case of emergency, use a bicycle pump; even an automobile pump has been used successfully. Be as careful to prevent infection as possible.

Navel Rupture.

The navel or umbilicus is the passage through which the blood vessels pass from the womb to the fetus or unborn calf. Sometimes this aperture remains open and a portion of the bowels or lining of the stomach may slip through the opening. This may be caused by any severe straining or blow on the belly.

Treatment.—The smaller ruptures often cure themselves. Where there are no indications of the rupture healing of its own accord, place the calf on its back and gently assist the organs to return into the abdomen. Clip the hair from the skin covering the hernia, smear the skin with pitch and cover with about ten folds of cotton or linen used as a compress. Next pass a bandage about 4 inches wide round the body to hold the compress in place. Smear bandage and compress

with pitch to hold it in place. In extreme cases where the sac will not return, cut the skin open in the long direction, replace the parts and sew with catgut. This should be done by a veterinarian.

Open Joint.—(See "Horse Department," Page 170).

Paralysis of Hind Parts During Pregnancy.

In unthrifty, weak, or ill-fed cows, the hind limbs and tail may become paralyzed during the last weeks they are pregnant. Exposure to wet and cold in this condition hastens this disease.

Symptoms.—The rectum is often completely clogged. Loss of use of hind quarters.

Treatment.—Give an abundance of warm food and a dry warm bed. Rub the back loins and limbs vigorously with a liniment of equal parts of oil of turpentine and sweet oil. If an electric battery is handy send a current of electricity through the muscles in the hind limbs daily.

Peritonitis.

This consists in an inflammation of the delicate membrane lining the abdomen and its organs. It is usually caused by a wound and may follow an operation for hernia or castration.

Symptoms.—Animal is uneasy and shivers; turns its head towards its belly; has no appetite; nose is dry; does not chew the cud; legs are placed well under its body; pulse is weak; pressing the flanks produce pain.

Treatment.—Discover and remove the cause. Give 2 ounces of borax every six hours until three doses are given, then give 6 teaspoonfuls three times daily. Use injections instead of laxatives to loosen the bowels. Sustain the strength by giving camphor or coffee. Place a blanket wrung out of hot water over the stomach, cover this with several dry blankets and strap them to the body. Change the wet blanket as soon as it cools. The object is to bring as much blood to the skin as possible. Give laxative food and such drinks as linseed tea. If the disease assumes a chronic form, give nutritious food such as grass, selected clover hay and linseed cake; also give one dram of iodide of potassium in a pint of water three times daily.

Pink Eye.—"Grip." (See "Horse Department," Page 171).

Pleurisy.

This is an inflammation of the thin membrane lining the chest and enveloping the lungs. It often makes pneumonia more serious. It often arises when a rib is broken, or from exposure to wet or cold.

Symptoms.—Severe pain, increased when animal moves. The pulse is hard and quick; the breathing is from the stomach, the chest being quite fixed. When pressed between the ribs, the animal flinches and grunts; nose is hot and dry; mouth slimy and the secretions scanty. After a few days the severity of

symptoms lessen, patient loses strength, the countenance is haggard and the eyes sink into their sockets. In unfavorable cases death occurs during the second or third week.

Treatment.—To reduce the fever in the early stages, give one to two drams of Fleming's tincture of aconite for a short time; discontinue as soon as the fever begins to abate. For relief of the cough, place a small tablespoonful of the following mixture frequently on the tongue or back teeth; 8 ounces pulverized Chlorate of potassium, 2 ounces fluid extract of belladonna, 8 ounces powdered licorice root, sufficient quantity of syrup. In the stage of effusion, give the following three times daily: one ounce Digitalis tincture, one-half to one teaspoonful iodide of potassium; mix. Give Glauber's salts or linseed oil to open the bowels. A plaster made of mustard and lard and fastened on the chest will give relief.

Pneumonia.

This disease is an inflammation of the lining substance caused by congestion; this may be brought about by exposure to wet or cold, or sudden change in temperature. A cow with this disease always lies down as she has more lung space for breathing in this position. A horse always stands up for the same reason.

Symptoms.—Animal chills, pulse quickens, nostrils are dilated, nose is hot and dry, the skin is harsh and dry, the tongue is slimy, the urine is diminished and high colored and the bowels constipated. Animal stands with forelegs wide apart. In second stage the cough is quick and painful, the secretions are suspended, the animal has a haggard look and the pulse is small. In the third stage if the animal recovers, the cough loosens, the appetite returns, and the symptoms leave.

Treatment.—Good nursing and surroundings are necessary. If the pulse is strong in the early stage, give one to two teaspoonfuls of Fleming's tincture of aconite every 4 or 5 hours. Do not give this after the fever begins to abate. If constipated, give 1 to 3 teaspoonfuls of calomel. In the second stage give the following mixture in a gruel three times daily: 2 ounces Spirits of nitrous ether and one ounce aromatic spirits of ammonia. Two to five teaspoonfuls carbonate of ammonia has been found beneficial. Apply counter irritants such as turpentine, mustard plasters or ammonia liniment.

Ring Worm.

This affection of the skin is caused by a vegetable parasite and is very contagious.

Symptoms.—Circular patches on the skin soon loosens the hair, the skin is slightly inflamed, later scaly, brittle crusts appear. The patches then appear a silvery-gray.

Treatment.—Wash with soap and water to remove all crusts, then apply sulphur ointment, tincture of iodide, acetic acid or nitrate of mercury ointment once a day. Cleanse and whitewash the stable thus destroying the spores scattered by the crusts.

Rupture—Ventral Hernia.

When one of the abdominal organs escape through a rupture in the abdominal muscles, the skin remaining intact, it is called a rupture and is caused by falls, kicks or blows.

Treatment.—When possible push the hernia back into the abdomen. Then place a layer of melted pitch and turpentine on the skin over the hernia, cover with a layer of soft cloth, then a new layer of pitch and turpentine is spread on the cloth. Then cover this with a piece of pasteboard which in turn is covered with the same preparation. Place a bandage about four inches wide so that it will retain the hernia long enough for the wound to heal permanently.

Scours.

Overloading the stomach by sucking the cow at long intervals, improper feeding of the cow, exposure to cold and damp, indigestion caused by feeding cold milk at long periods, feeding calves, damaged, sour or dirty food.

Symptoms.—Appetite is poor, calf is depressed, extremities are cold, sometimes there is fever, dung gradually grows cream colored and as light as milk. It has an offensive odor, later contains mucus and gas bubbles. There are pains when passing dung, belly contracted and back arched.

Treatment.—Remove the cause and treat promptly. Give nourishing feed in small quantities. Clean and disinfect the stalls and utensils. For the diarrhea, give a cup of strong coffee or two raw eggs. In severe cases, give one ounce of castor oil, one teaspoonful of creolin and twenty grains of subnitrate of bismuth. Repeat the creolin and bismuth with flaxseed tea every four hours. A dose of 15 to 30 grains of Tannopin may be given. When a calf which is fed by hand develops diarrhea, put four drops of formalin into each quart of its milk. Feed in the usual quantity. If the diarrhea is not much better in four days, use some of the remedies mentioned above. A paste of flour and water is good.

Sore Eyes—Inflammation of the Eyes.

Weeds, twigs or trees, stems of straw or hay, pieces of cornstalk, etc., may break off in the eye. While they may enter the eyeball, they more often glide off and enter between the eye and the ocular sheath.

Treatment.—Remove the object. To do this it is often necessary to cast the animal. Apply cooling washes and a cold water compress over the injured eye. Five drops of sulphate of zinc to 2 tablespoonfuls of water make a good wash. Boric acid is also very good. Maintain an opening for the discharge of pus when an abscess forms.

Sore Mouth—Stomatitis.

By eating some irritating substance the membrane of the mouth may become inflamed. Blisters may form in the mouth of calves because of indigestion.

Symptoms.—Saliva runs from mouth, surface of tongue appears red and inflamed and sometimes small red elevations appear.

Treatment.—When merely red and inflamed, syringe the mouth out with four ounces of the following solution: one ounce alum and one quart of water. Do this several times daily. When the tongue and mouth are covered with ulcers, paint them daily with a solution consisting of twenty grains permanganate of potassium and one ounce of water. When indigestion is associated with this disease, treat it separately.

Sore Throat.—(See "Horse Department," Page 175).

Sprains.—(See "Horse Department," Page 176).

Stifle.—(See "Horse Department," Page 177).

Stomach Worms in Calves.—(See "Sheep Department," Page 211).

Stringy Milk.

Often caused by the cow drinking water in which there is a spongy morbid growth.

Treatment.—Eliminate the cause. Give the animal plenty of pure water. Give each affected cow 2 drams bisulphite of soda daily and the trouble will promptly stop.

Sunstroke.

Exposure to rays of sun, confinement in hot close places, driven some distance in hot weather, often cause sunstroke.

Symptoms.—Frothing at the mouth, tongue hanging out, panting, dullness, animal is uneasy and may stagger, fall and soon become quiet.

Treatment.—In light cases remove to a sheltered, quiet place and give a light diet for several days. When animal has fallen, apply cold water or ice to the head, rub the limbs and body with straw or cloths for some time. If the animal can swallow give three teaspoonfuls of strong ammonia in a quart of cold water, $1\frac{1}{2}$ ounces aqua ammonia will be found just as good. If the animal cannot swallow, inject the ammonia and water into the rectum. Help the animal to the nearest shelter as soon as it can rise and give it all the cold water it will drink. Repeat the ammonia and water twice at half hour intervals, then each three hours until strength returns. Give bran slops and a little grass for several days. Where the animal has been unconscious but strength has returned, 12 ounces of Epsom salts in a quart of warm water may be given.

Texas Fever.

This is a blood disease caused by indirect infection. Cattle from an infected district first infect pastures, cars, pens, etc., where other cattle obtain the infection secondhand. The ticks which adhere to the infected cattle are the only known means of carrying the infection to other cattle. The tick is essentially a parasite. It obtains its food when attached to the skin of cattle and can mature no place else. The female drops to the ground and lays a large number of eggs which hatch in from three to six weeks according to the temperature. When hatched the tick soon finds its way on to cattle and growth begins. Cattle may have Texas fever in one week after the young ticks get on them.

Symptoms.—There is dullness, loss of appetite, the animal stands alone, high fever appears, later the urine has a deep red color, rapid loss of strength and death. The dung becomes soft and deeply tinged with bile. As the end approaches the animal gets very thin, may lie down much of the time and appear stupid.

Treatment.—No satisfaction of a permanent nature is secured from the use of medicines. Animals may be freed of ticks in two ways. They may be treated with an agent that will kill all the ticks present, or they may be rotated on tick-free fields until all the ticks have dropped. All the ticks will drop from cattle placed on tick-free soil in from six to ten weeks according to temperature. The time required to free pastures from ticks by starvation is from eight to ten months according to climate and temperature. To do this all animals must be kept from the field for this period.

Grease the limbs and sides of the cattle with crude petroleum or cotton seed oil. This helps to prevent the ticks crawling onto the body. Smear a mixture consisting of one pound sulphur, one gallon of kerosene, and one gallon cotton seed oil. Do this three times each week during the tick season.

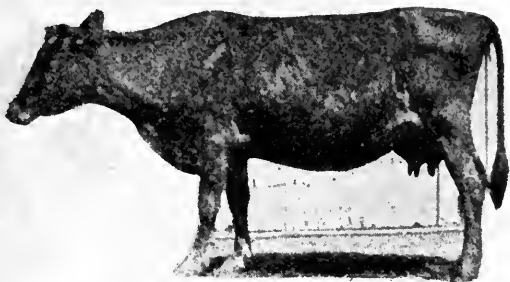
Tuberculosis.

This germ, called tubercle bacillus, gains entrance to the body, lodges in the tissues and begins to grow and multiply at that point. As they spread through the body they cause the formation of many small knob-like masses. These masses unite and often form tubercular material of great size.

Symptoms.—A short dull cough is noticed when the lungs are involved. As the disease progresses the animal grows thin, the skin grows harsh, eyes sink in their sockets, quality of milk lessens and there is tenderness of chest when pressure is applied.

Treatment.—Treatment is not seriously considered. However, many cases can be prevented. Great care should be given to the feed, surroundings and breeding of the animal, so it may resist infection when exposed to it. Apply the tuberculin test to all strange cattle before permitting their entrance into the herd. Do not allow healthy cattle to stay near an infected one. After slaughtering the affected animal, scrub and disinfect the stables and walls. Remove all manure and disinfect. A rigid exclusion of tuberculous animals will prevent the appearance of the disease.

Tuberculin Test.—Stable and feed cattle as usual. Examine each one and give a number by which it will be known during the test. Take the temperature three or four times at two hour intervals on day of injection. At 8 or 10 p. m. inject a dose of tuberculin under the skin in the region of the shoulder. First disinfect the skin at point of injection with a 5 percent solution of carbolic acid or any good antiseptic solution. It is not necessary to dilute the tuberculin made by the Bureau of Animal Husbandry; the dose is 2 cubic centimeters for a grown cow. Yearlings and 2-year-olds may receive from one to one and a half cubic centimeters. Extra large animals and bulls may receive 3 cubic centimeters. Begin taking temperatures the next day at 6 a. m., and continue two or



A TUBERCULOUS DAIRY COW

Such cattle expel tubercle bacilli almost without exception with their feces and with a material that is drooled, slobbered and sprayed from their mouths.



Tuberculosis of Sirloin and Porterhouse Cuts of Beef



Tuberculosis of Pleura of a Cow. So-called "Pearly Disease."

three hours until the twentieth hour after injection, or until 4 or 6 in the afternoon. If the temperature shows no tendency to rise, the test may cease. If there is a rise of two or more degrees Fahrenheit above the highest temperature of the preceding day, providing the temperature exceeds 103.8 degrees F., it should be taken as an indication of tuberculosis.

Vaginal Rupture or Hernia.

This often happens during pregnancy from chronic relaxation of the vaginal walls, or lying in stalls that are higher in front than behind.

Symptoms.—The protrusion is smooth and of a rounded form. If it covers both sides of the canal it is double, with a passage between.

Treatment.—Sometimes remedied by raising the hind part of the stall higher than the front part. A home-made truss may be applied and worn until the period of calving approaches.

Warts.

A hard, dense clublike growth on the skin.

Treatment.—They may be removed with the scissors, or ligatured by means of a horse hair or rubber band. Burn the roots with tincture of iron, lunar caustic or glacial acetic acid. Never use acid near the mouth or eyes. Give young cattle Fowler's solution of arsenic, one tablespoonful twice each day for a calf six months old.

Yellows—Jaundice.

It may arise from the presence of gallstones or parasites in the biliary ducts. These close up the ducts and the bile, which then passes into the intestines, may be absorbed and cause the yellow staining of jaundice. This happens when there is an inactive condition of bowels as in constipation. A swollen condition of the mucous membrane of the small intestine may also cause the disease.

Symptoms.—The appetite is poor; the animal drinks very little; the white of eyes and lining of mouth are yellow, the urine is yellow or brown; animal lies down and moans when it moves; it staggers when it walks. Pressure on the short ribs on the right side produces pain.

Treatment.—Move the bowels by giving one pound of sulphate of soda, one pint of molasses and one quart of warm water. Follow this with a heaping tablespoonful of artificial Carlsbad salt in the feed three times daily. Give injections of warm soapy water. Give laxative diet like coarse bran mash, pulped roots and grass or hay in moderate quantities.

Types and Market Classes.—Horses of various types are indispensable in spite of the large number of automobiles and auto trucks. The farm and other lines of industry will always require a given amount of horse labor. Horses suitable for serving different purposes must continue to be produced and the farm is one of the most satisfactory places to produce them.

The height, weight, form, action and disposition of the horse signifies its type. Its usefulness and market value will depend upon which of the several types it represents and upon its age, soundness, condition and ability to work. The market value will further depend upon the supply and demand. The more common types of horses furnish the greater supply and sell at the lowest prices. Misfits, or horses that do not conform to definite market types, are difficult to sell. There is a demand and an established market for types of horses suitable for doing definite kinds of work. Such horses are bought and sold on general markets under classes and subclasses that are named and briefly described in the following tabulation:

MARKET CLASSES AND SUB-CLASSES OF HORSES.*

Classes.	Sub-Classes.	Height, Hands.	Weight, Pounds.
Draft Horses.....	{ Light Draft..... Heavy Draft..... Loggers.....	15-3 - 16-2 16-0 - 17-2 16-1 - 17-2	1600 to 1750 1750 to 2200 1700 to 2200
Chunks.....	{ Eastern and Export Chunks. Farm Chunks..... Southern Chunks.....	15-0 - 16-0 15-0 - 15-3 15-0 - 15-3	1300 to 1550 1200 to 1400 800 to 1250
Wagon Horses.....	{ Expressers..... Delivery Wagon..... Artillery Horses..... Fire Horses.....	15-3 - 16-2 15-0 - 16-0 15-1 - 16-0 15-0 - 17-2	1350 to 1500 1100 to 1400 1050 to 1200 1200 to 1700
Carriage Horses.....	{ Coach..... Cobs..... Park Horses..... Cab.....	15-1 - 16-1 14-1 - 15-1 15-0 - 15-3 15-2 - 16-1	1100 to 1250 900 to 1150 1000 to 1150 1050 to 1200
Road Horses.....	{ Runabout..... Roadster.....	14-3 - 15-2 15-0 - 16-0	900 to 1050 900 to 1150
Saddle Horses.....	{ Five-gaited Saddler..... Three-gaited Saddler {Light. • Heavy}	15-0 - 16-0 14-3 - 16-0	900 to 1200 900 to 1200
	{ Hunters {Light Middle } Heavy }	15-2 - 16-1	1000 to 1250
	Cavalry Horses..... Polo Ponies.....	15-0 - 15-3 14-0 - 14-2	950 to 1100 850 to 1000

* University of Illinois Bulletin No. 122.

It only pays to breed horses of a definite type and character. Prices paid on the Chicago market for the different classes of horses for the year 1916. show the trend of market values. Horses five to eight years of age, sound, in good condition for hard work and of colors easily matched, sell for the best prices.

MONTHLY AVERAGE PRICE OF HORSES FOR YEAR 1916.

Month	Draft Horses	Carriage Horses*	Drivers	General Use	Bussers and Trammers	Saddlers	Chunks
January.....	\$210	\$435	\$160	\$145	\$165	\$185	\$ 95
February.....	220	475	165	150	175	195	100
March.....	225	490	170	155	180	200	110
April.....	225	490	170	155	180	200	110
May.....	220	490	165	155	175	195	100
June.....	215	490	165	150	170	195	100
July.....	210	485	165	145	170	190	95
August.....	205	475	160	140	165	185	90
September.....	200	460	155	140	165	180	85
October.....	200	450	150	140	165	175	90
November.....	205	450	150	140	160	175	90
December.....	200	450	150	140	160	170	95
Average, 1916....	210	470	160	146	169	187	96

* Prices are for pairs.

Breeds of Horses.

The best types of horses show a predominance of breed character. Breed and feed are the principal factors that determine type. The table on pages 103 and 104 names and furnishes a brief description of the more important breeds of horses bred and maintained in America at the present time.

Draft vs. Light Breeds on the Farm.—Market values and the fact that heavy weight and ability to work are the principal features demanded in the breeds of draft horses, make it appear that, under ordinary conditions, horses of the draft type are best for the farmer to produce. Much of the value of the lighter classes of horses is developed by training, which the farmer is not always in the best position to give. Light horses that have to do heavy work do not have the opportunity to develop gaits, manners and a spirit that makes them attractive and are also rendered unsalable by accidents resulting in blemishes. Furthermore, the automobiles and auto truck have taken the places of the lighter classes of horses to a much larger extent than they have for horses of the draft breeds.

Breeding the Draft Horse.—A weight of 1600 lbs. or over, feet, limbs and body of sound character, a compact form with strength and quality, and a disposition that is kind and intelligent, are the more essential features of a good draft horse. "Like produces like" and, therefore, the production of desirable draft horses is secured by the selection of mares of grade or draft breeding free from hereditary unsoundnesses, mating them to pure bred draft stallions of the most approved types, and rearing the foals in a manner to

TYPES AND BREEDS OF HORSES.

Type	Breed	Nativity	Weight	Height Hands	Color and Characteristics
	Belgian.	Belgium.	1500-2000 1200-1800	15.3-17	Bay, roan, chestnut, brown, black, gray. Body compact, deep, heavily muscled. Legs short and clean.
	Clydesdale.	Scotland.	1800-2100 1500-1800	16 -17	Bay, black, chestnut, roan, brown with white on face and legs. Feather on legs. Intelligent; good action.
	Percheron.	France.	1700-2200 1500-1800	15.3-17	Gray, black, bay, brown, roan, chestnut. Legs clean. Intelligent; good action. Most popular draft horse in America.
Draft.....	Shire.	England.	1800-2400 1600-1800	16-17.3	Bay, brown, chestnut, roan, black with white on face and legs. Feather on legs. Feet and bone large. Heaviest of draft breeds.
	Suffolk.	England.	1600-2000	16-16.2	Chestnut. Legs clean. Body broad and deep. Smallest of draft breeds.
	Hackney.	England.	750-1300	13.2-16	Any color. Extremely high action. Good feet. Type ranges from pony to heavy coach.
Coach, Carriage, or Heavy Harness.....	French Coach.	France.	1300-1475 1100-1300	15.2-16	Bay, black, chestnut. Clean limbs. High action. Body long.
	German Coach.	Germany.	1350-1475	16-16.2	Black, bay, brown. Legs, clean. Feet excellent. Body comparatively deep.
	Cleveland Bay.	England.	1250-1550	16-16.3	Bay with black legs, mane and tail. Legs clean. Head quite large. Largest of coach breeds.
	Standard Bred.	United States.	1000-1200	15-16	Bay, brown, black, chestnut, gray. Feet good. Body comparatively deep. Trotters or pacers. Remarkable speed and endurance. Highly intelligent.
Roadster or Light Harness.....	Orloff.	Russia.	1000-1300	15.3-16	Gray, white, black, chestnut, bay. Substantial in size and type.
	Morgan.	United States.	950-1100	14-15	A branch of the American Standard-bred. A sturdy roadster type.

TYPES AND BREEDS OF HORSES—Continued.

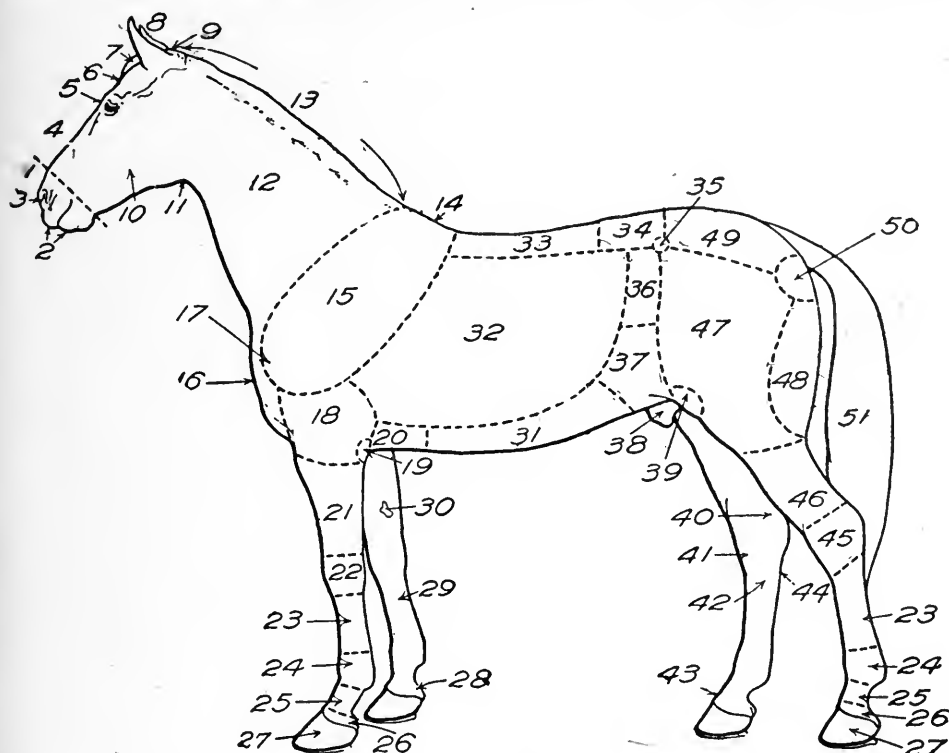
Type	Breed	Nativity	Weight	Height Hands	Color and Characteristics
Saddle.....	Thoroughbred.	England.	900-1050	14.2-16	Bay, brown, chestnut. Head, small; neck, long. Muscular and speedy. Excels in running races.
	American Saddle Horses.	United States.	950-1150	15-16	Bay, black, chestnut, gray. Highly intelligent. Extreme action and style with numerous gaits.
Pony.....	Shetland.	Shetland Islands.	200-350	9-10.2	Color variable—piebald or spotted quite common. A miniature draft horse in type. Ears, short; hair, abundant.
	Welsh.	Wales.	600-1000	12-15	Color, variable. A small coach horse in type. Prominent in style, action, and endurance.
	Indian Mustang Broncho.	America.	600-1000	Under 14.2	Variable in color and size. Remarkable in endurance. Often high class and attractive.
	Hackney.	England.	750-800	Under 14.1	Small, with general characteristics of the Hackney horse.

secure a maximum normal growth. Diseases like heaves, roaring, moon-blindness and weakened, malformed limbs predisposed to curbs, spavins, ring-bone and other diseases of the feet and limbs and which are hereditary, should be avoided both in the mare and in the stallion.

Breeding Light Horses.—Particular emphasis must be placed upon purity of breeding and breeding in line where one undertakes to produce light horses. This system of breeding is highly essential to the successful production of this type of horses. Families or strains that have excelled in the type, quality, disposition and spirit desirable must be depended upon. A carriage horse is heavier than the roadster, but weight is less important than style and action in both types. Cold blooded, indifferent light horses are misfits incapable of high development and may be regarded unprofitable.

Judging Horses.—It is important to be able to judge a horse and know his value. One's ability to exercise good judgment in the selection of horses is developed largely by learning to know all the parts of the horse and their relationship to one another in forming a well-balanced body. With this there must be the proper disposition, energy and training that combines to enable the horse to do its work efficiently. Practice makes perfect when one has learned the parts and disposition of horses and acquired the ability to observe

carefully and quickly and arrive at a judgment. The parts of the horse named in the accompanying score card for light and draft horses, together with the discussion of diseases and blemishes, should enable one to acquire the art of



Parts of the Horse.

- | | | |
|------------------------|-----------------------|--------------------------|
| 1. Muzzle. | 18. Arm. | 35. Point of hip. |
| 2. Lips. | 19. Elbow. | 36. Coupling. |
| 3. Nostril. | 20. Fore flank. | 37. Hind flank. |
| 4. Face. | 21. Forearm. | 38. Sheath. |
| 5. Eye. | 22. Knee. | 39. Stifle joint. |
| 6. Forehead. | 23. Cannon. | 40. Seat of thoroughpin. |
| 7. Foretop. | 24. Fetlock joint. | 41. Seat of bog spavin. |
| 8. Ears. | 25. Pastern. | 42. Seat of bone spavin. |
| 9. Poll. | 26. Coronet. | 43. Seat of ringbone. |
| 10. Jaw. | 27. Hoof. | 44. Seat of curb. |
| 11. Throatlatch. | 28. Seat of sidebone. | 45. Hock. |
| 12. Neck. | 29. Seat of splint. | 46. Gaskin. |
| 13. Crest. | 30. Chestnut. | 47. Thigh. |
| 14. Withers. | 31. Abdomen. | 48. Quarter. |
| 15. Shoulder. | 32. Ribs. | 49. Croup. |
| 16. Breast. | 33. Back. | 50. Point of buttock. |
| 17. Point of shoulder. | 34. Loin. | 51. Tail. |

judging horses and be competent to make selections without chances for loss or disappointment.

The Brood Mare.—It is a serious mistake to use mares retired from work because of unsoundness or old age for breeding purposes. The best plan for

SCORE CARD FOR DRAFT HORSES.

SCALE OF POINTS	Pos- sible score	Points deficient		Points deficient	
		Stud- ent's score	Cor- rected	Stud- ent's score	Cor- rected
GENERAL APPEARANCE—30 POINTS					
Height, 16 hands or over					
Weight, 1,500 lbs. or over					
Weight	6				
Form, broad, massive, evenly proportioned, symmetrical, blocky	6				
Quality, refined; bone clean, large, strong; tendons, clean, defined, prominent; skin and hair fine; "feather," if present, silky	6				
Action, walk, fast, elastic, regular, straight; trot, free, springy, balanced, straight	10				
Temperament, energetic; disposition, good	2				
HEAD AND NECK—10 POINTS					
Head, proportionate size, clean cut, well carried; profile straight	2				
Forehead, broad full	1				
Eyes, bright, clear, full, same color	2				
Ears, medium size, well carried, alert	1				
Muzzle, neat; nostrils large, flexible; lips thin, even, firm	1				
Lower Jaw, angles wide, space clean	1				
Neck, muscled, arched; throat-latch, fine, wind-pipe large	2				
FOREQUARTERS—20 POINTS					
Shoulders, moderately sloping, smooth, snug, extending well back	2				
Arm, short, strong muscled, thrown back, well set	1				
Forearm, long, wide, clean, heavily muscled	1				
Knees, straight, wide, deep, strong, clean	2				
Cannons, short, wide, clean; tendons clean, defined, prominent	2				
Fetlock, wide, straight, strong, clean	1				
Pasterns, moderately sloping, strong, clean	3				
Feet, large, even size, sound; horn dense, waxy; soles concave; bars strong, full; frogs large, elastic; heels wide, one-half length of toe	8				

SCORE CARD FOR DRAFT HORSES—Continued.

SCALE OF POINTS	Pos- sible score	Points deficient		Points deficient	
		Stud- ent's score	Cor- rected	Stud- ent's score	Cor- rected
BODY—10 POINTS					
Chest, deep, wide; breast bone, low; girth, large	2				
Ribs, deep, well sprung, closely ribbed to hip...	2				
Back, broad, strong, muscular	2				
Loins, short, wide, thick muscled	2				
Underline, low, flanks full	2				
HINDQUARTERS—30 POINTS					
Hips, broad, smooth, level, well muscled	2				
Croup, wide, heavily muscled, not markedly drooping	2				
Thighs, deep, broad, strong, muscular	2				
Quarters, plump with muscle, deep	2				
Stifles, large, strong, muscular, clean	1				
Gaskins, (lower thighs,) long, wide, clean, heavily muscled	2				
Hocks, large, strong, wide, deep, clean, well set	8				
Cannons, short, wide, clean; tendons clean, defined, prominent	2				
Fetlocks, wide, straight, strong, clean	1				
Pasterns, moderately sloping, strong, clean	2				
Feet, large, even size, sound; horn, dense, waxy; soles concave; bars strong, full; frogs large, elastic; heels, wide, one-half length of toe, vertical to ground	6				
Total	100				

(Score card used at Wisconsin College of Agriculture, Madison, Wis.)

the farmer is to have one or more mares of the best individuality and keep them raising foals, year after year, as long as they are successful in doing so.

The Pregnant Mare.—Exercise is necessary and one of the things often neglected especially during the winter season in caring for the brood mare that is in foal. It is best to work the mare under conditions that insure against overwork and strains that result from too heavy loads. The mare foals 48 weeks or about 340 days after the time of service. During this time she should occupy a comfortable stall and when she begins to show signs of being in

SCORE CARD FOR LIGHT HORSES.

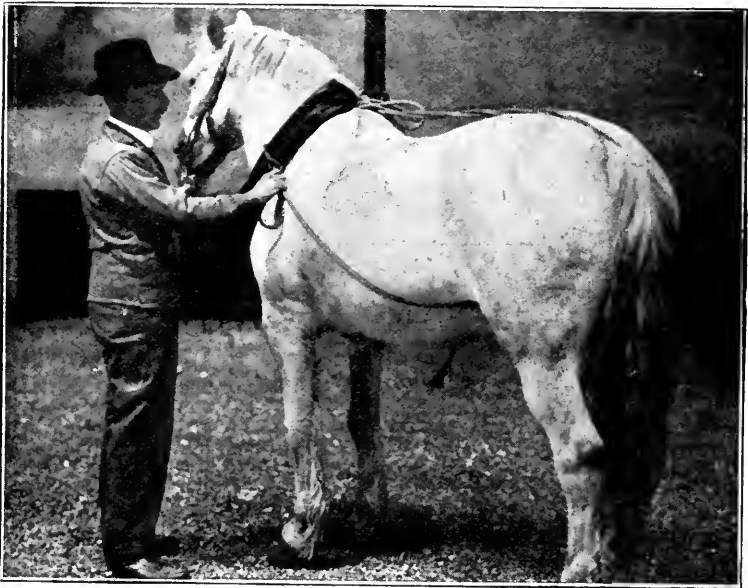
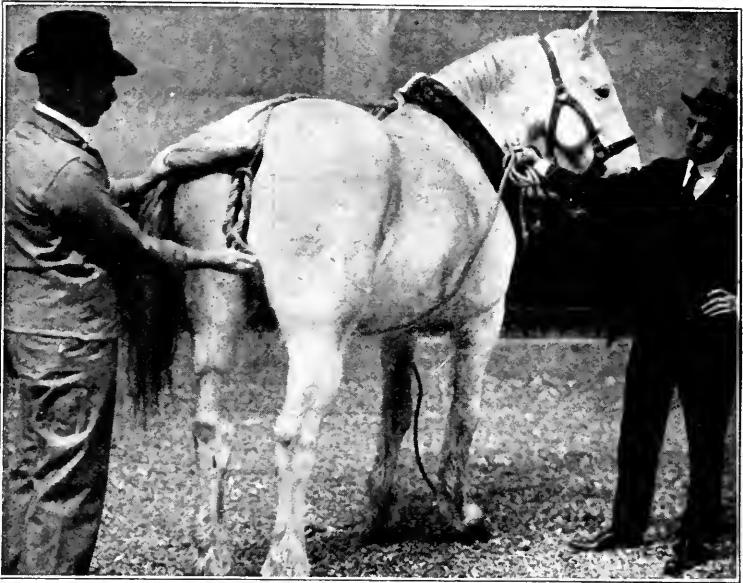
SCALE OF POINTS	Pos- sible score	Points deficient		Points deficient	
		Stud- ent's score	Cor- rected	Stud- ent's score	Cor- rected
GENERAL APPEARANCE—30 POINTS					
Weight, estimated in lbs.					
Height, estimated in hands.					
Height, 15 hands or over.	2				
Form, type—symmetrical, smooth, stylish.	5				
Quality, refined; bone clean, fine, tendons clean, defined, prominent; hair and skin fine.	5				
Action, walk, long, fast, elastic, regular, straight; trot, rapid, regular, straight, balanced.	15				
Temperament, active, disposition good.	3				
HEAD AND NECK—10 POINTS					
Head, proportionate, well carried, features well defined, profile straight.	2				
Forehead, broad, full.	1				
Eyes, full bright, clear, large, same color.	2				
Ears, medium size, pointed, well carried, alert. .	1				
Muzzle, neat, nostrils large, flexible; lips thin, firm, even.	1				
Lower Jaw, angles wide, space clean.	1				
Neck, muscled, arched; throat-latch fine; wind- pipe large.	2				
FOREQUARTERS—20 POINTS					
Shoulder, long, sloping, smooth, extending well back.	3				
Arm, short, strong muscled, thrown back, well set.	1				
Forearm, long, wide, clean muscled.	2				
Knees, straight, wide, deep, strong, clean, strongly supported.	2				
Cannons, short, clean, wide; tendons large, hard, clean, prominent.	2				
Fetlocks, wide, straight, strong, clean.	1				
Pasterns, lengthy sloping, strong, clean.	3				
Feet, medium size, even, sound; horn dense, waxy; soles concave; bars strong, full; frogs large, elastic, heels, wide, one-half length of toe.	6				

SCORE CARD FOR LIGHT HORSES—Continued.

SCALE OF POINTS	Pos- sible score	Points Deficient		Points deficient	
		Stud- ent's score	Cor- rected	Stud- ent's score	Cor- rected
BODY—10 POINTS					
Withers, high, extending well back	1				
Chest, deep, low; girth large	2				
Ribs, deep, well sprung	2				
Back, broad, strong, muscular	2				
Loins, short, wide, thick muscled, close coupled .	2				
Underline, low, flanks full, well let down	1				
HINDQUARTERS—30 POINTS					
Hips, smooth, wide level	2				
Croup, long, wide muscular, not drooping	2				
Tail, attached high, well carried	1				
Thighs, deep broad, strong, muscular	3				
Quarters, deep, plump with muscle	1				
Stifles, strong, muscular, clean	2				
Gaskins, (lower thighs) long, wide, muscular . .	2				
Hocks, large, strong, wide, deep, clean, well set .	7				
Cannons, short, clean, wide; tendons large, hard, clean, prominent	2				
Fetlocks, wide, straight, strong, clean	1				
Pasterns, strong, sloping, springy, clean	3				
Feet, medium size, even, sound; horn, dense, waxy; soles concave; bars strong; full; frogs, large, elastic; heels, wide	4				
Total	100				

(Score card used at Wisconsin College of Agriculture, Madison, Wis.)

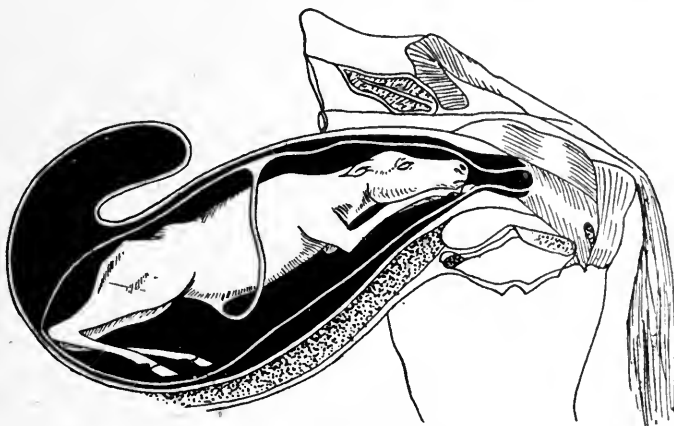
foal, a box stall well ventilated and as comfortable as it can be made should be provided. A mare never should be allowed to foal in a narrow stall or too small a box stall. The stall should be kept clean, dry and well bedded. In the warmer seasons of the year it is better for mares to foal in a secreted place in the pasture field rather than in an unsuitable stall.



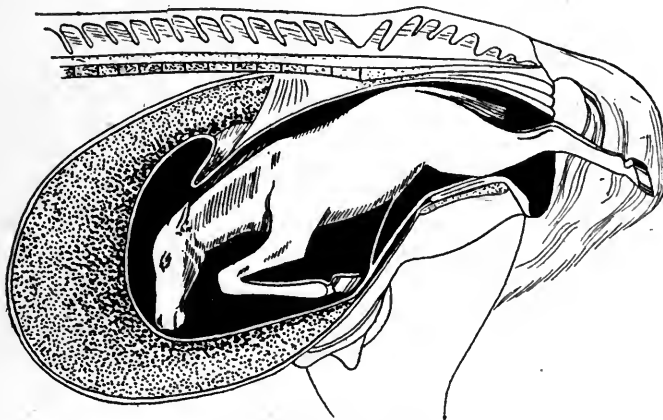
DELWART'S TRUSS

This supports vagina and prevents escape of womb when after pains following parturition cause heavy straining.

Stall Suitable for Mare Foaling.—Stalls 12 x 12 feet and preferably 14 x 14 feet should be provided for brood mares. An absolutely clean foaling place is necessary, to safeguard the foal against infection resulting in navel and joint disease. To prepare the stall for foaling and to insure against infection it is recommended that the floor be scraped and cleansed and sprinkled with a 1 to 50 solution of coal tar disinfectant or a solution of four ounces of



Front Feet First



Hind Feet First

NORMAL PRESENTATIONS

Furnished by the U. S. Dept. of Agriculture.

sulphate of copper (blue stone), to one gallon of hot water, or a 1 to 1,000 solution of corrosive sublimate. Follow the cleansing with a coat of lime whitewash to each gallon of which has been added 1-3 of a pound of chloride of lime. Bed the stall with fresh, dry straw that is free from chaff and dust and keep it as clean as possible until the mare has foaled.

The Mare at Foaling Time.—As foaling time approaches the mare should be given lighter work and the ration decreased. Laxative foods to keep the bowels

acting freely should be supplied. Bran and a little flaxseed meal, carrots or roots produce a laxative condition and relieve constipation which must be avoided. About three days before foaling wax will form on the teats. At this time the mare should occupy the box stall prepared for foaling, and be watched until the foal is born.

Watch the mare from a distance where she will not be disturbed or excited by one's presence when she has gone approximately her full gestation period and there are indications that she is about to foal. Ordinarily no assistance in foaling is necessary and the mare should be left alone. It pays, however, to be where assistance can be given if necessary.

If conditions are normal it is best to leave the mare alone for a time after she has foaled. If the afterbirth does not come away within an hour, or two, it should be removed. One experienced in doing this should perform the work. In all instances the afterbirth should be removed from the stall as soon as it comes away from the mare. The stall should also be cleaned and fresh bedding supplied.

Delivering Hind Feet of Colt First.—To meet this situation first tie a strap tightly around the breast of the mare to stop her straining. Then you can get your arm into the vagina, turn the colt around and save the life of both the mare and the colt.—Recommended by Will Perry, DeWitt, Iowa, Route 1.

Labor Pains Coming on Before Mouth of Womb is Relaxed.—When this happens pass the hand into the vagina and dilate the opening of the womb. Use the thumb and finger at first but later the hand. Be sure the nails are short and the hand is well oiled with carbolic acid and sweet oil or vaseline (1 part to 10 of oil or vaseline) before the hand is passed.

When to Assist Most.—Assist the mother when she is making an effort herself. Remember a delivery cannot be accomplished unless you are pulling on both forefeet or both hind ones.

Calf or Colt Dropsical.—If the calf or colt is found dropsical push it back, take your knife and tap its belly and then help finish the delivery.

Water on Head of Foetus.—If water is found on the head of the foetus it should be tapped with a small knife or small trocar.

Feet or Head of Calf or Foal Turned Back.—When this occurs push the foetus back into position, arrange the parts as they should be and produce a natural delivery. The back quarters of the mother should be raised almost a foot before this operation is begun. It makes delivery easier many times in such cases if pieces of soft rope are tied around the feet and head of the foetus before it is pushed back. One should remember which ropes are on the feet and which one is on the head.

Cleanliness.—In assisting a cow or mare one should always have his hands perfectly clean and should use disinfectants to kill all germs.

Care in Assisting at Birth.—One should always be careful in helping the mare or cow as the parts are easily injured. Be sure the fingernails are short and smooth.

Offer the mare a pailful of lukewarm water a half hour after the birth of the foal and again at intervals of two hours. Blanket her if the stable is at all



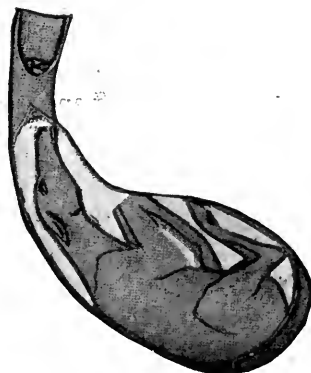
Ant. Presentation. Limbs Bent on Abdomen



Ant. and Dorsal Presentation. Left Leg Bent on Itself



Posterior Presentation. Group and Hock Deviation



Anterior Presentation. Limbs Bent on Breast



Posterior Presentation. Right Leg Bent on Itself



Ant. Presentation. Limbs on the Neck

ABNORMAL PRESENTATIONS

cold and there is danger of her becoming chilled. If she is accustomed to a mash of steamed feed such a feed of oats and bran may be fed an hour after foaling, otherwise give her a small feed of her ordinary grain ration. Under favorable conditions the mare in foal may be exercised after a few days and in 12 to 15 days she should be recovered from foaling and able to resume light work.

Feed for the Brood Mare.—Properly feeding the brood mare insures success in developing a strong, well developed foal. During pregnancy she should be fed sound, whole oats, pure wheat bran and mixed clover or timothy hay. A few ears of corn with the oats and bran will keep her in good condition and give strength to the foal. If the mare is idle, feed hay night and morning, and bright, dry fodder or other good roughage at noon scattered in the field or paddock, when weather permits her to be out. One feed of hay at night, one feed of corn stalks and access to a rack of bright straw and a few ears of corn daily has been recommended as a suitable ration for idle mares. Avoid moldy hay or silage, damaged grain, fodder or rusted straw. Give plenty of pure, fresh water. Allow free access to salt if mare has been accustomed to it, otherwise feed salt in limited quantities until she has become satisfied and may have free access to it without overeating. Do not allow the mare to become too fat, but keep her in fair flesh, and do not let her condition indicate too scanty a ration.

Oats and bran in equal bulk and $\frac{1}{4}$ in bulk of corn, makes a good ration for a mare in milk. It is a good plan to moisten this before feeding if it is practicable. Clover or alfalfa hay and grass pasture in season, if mare can be turned out, provide most suitable roughages for keeping up a good milk flow. The condition of the mare, her milk flow and the condition of the colt, should govern the feeding, and judgment must be exercised to the fullest extent possible.

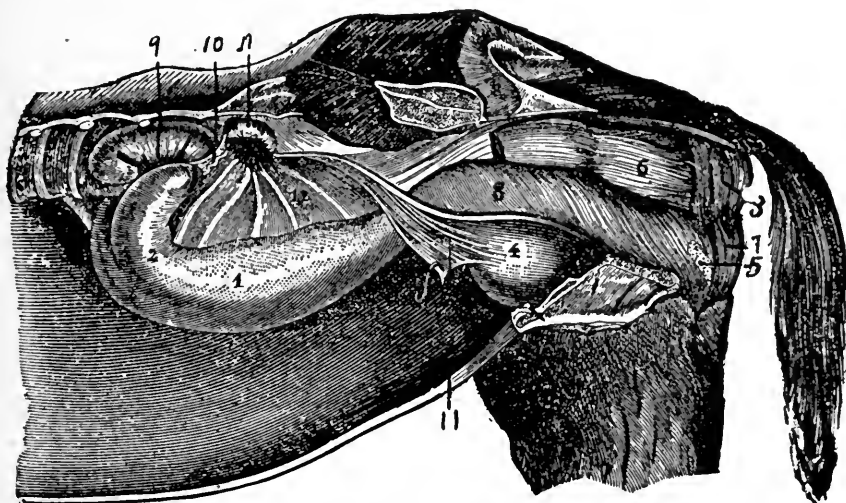
Care of Foal at Birth.—The first and most important attention to give to the foal is to see that the navel cord has been properly severed and disinfected. Navel and joint disease, from which many colts die, gains entrance to the system through the navel cord. Every precaution should be taken to prevent infection from filth or germs of any kind. It is best for the cord to break off naturally in which case it is unnecessary to tie it. If the cord has to be cut, disinfect a string in five percent solution of lysol or carbolic acid, or a 1-500 solution of corrosive sublimate (bichloride of mercury), tie it one inch from the body and cut it below the knot. Castrating instruments, the emasculator or ecraseur, if at hand, may be used to pinch the cord off and thus make it unnecessary to tie the cord.

Whether the cord is tied or not it should be saturated with a disinfectant twice a day until it shrivels up and no raw spot remains. Do not saturate the body of the foal. Fresh lard or vaseline smeared on the foal's belly will prevent the disinfectant blistering it.

Solution for Saturating Foal's Navel.—The following disinfectant has been recommended by Dr. A. S. Alexander, of the Wisconsin College of Agriculture, and used effectively:

Powdered corrosive sublimate, 2 drams; boiling water 1 pint. When cool, color the solution with 2 drams of tincture of iron. The solution is poison and should be so marked and kept away from the reach of children.

If it is not possible to use this solution and to give attention to foals frequently, it is recommended that the stump of the navel be saturated with full strength tincture of iodine and covered with a dry dressing powder composed of



ORGANS OF A MARE

- | | |
|--------------------|------------------------|
| 1. Uterus. | 8 Vagina. |
| 2. Horn of Uterus. | 9. Kidney. |
| 3. Anus. | 10. Oviduct to Uterus. |
| 4. Bladder. | 11. Abdominal Muscle. |
| 5.—7. Vulva. | 12. Ovary. |
| 6. Rectum. | |



Foal With Water on the Brain.

one part each of calomel, powdered alum and either tannic acid or starch and five parts of boric acid. Keep the navel as well coated with the powder as possible.

A supply of good disinfectant kept on hand and used properly at foaling time. will insure against losses that are more or less certain to occur without them.

Caring for Weak Foals.—A strong foal will be on its feet and nursing in a very short time and requires no assistance. Weak foals should be assisted to suck until they gain enough strength to do so alone.

The bowels of a weak foal and even of a strong one, may need attention. If there is not a prompt bowel movement, give an injection of either warm water, sweet oil or equal parts of cream and molasses and warm water. A small rubber hose, or a fountain syringe with a small rubber nozzle is best to use in giving an injection. A dose of two or four tablespoonfuls of castor oil in milk should be given if bowels do not move in 24 hours.

Scouring is an indication of bowel trouble, resulting in young foals from indigestion and constipation and there is no better remedy than castor oil and varying the ration to overcome or counteract the cause.

Feeding and Weaning the Foal.—Draft foals should make one-half their mature weight the first year of their life. To accomplish this they must be fed liberally. Foals should be accustomed to grain before five months of age, when they are usually weaned. After weaning the following ration will prove successful until they are turned out the second summer at 13 to 15 months of age:

Crushed oats	65 lbs.—
Corn meal.....	15 “
Bran	10 “
Finely cut alfalfa or clover.....	15 “

Feed all of this mixture they will eat three times per day. No other hay is necessary until they are one year old. A foal will eat 9 to 15 lbs. (20 to 30 qts.) daily, according to the age. To dampen and thoroughly mix the feed is an advantage. Where one is not in a position to feed such a mixture, a ration of 20 parts bran and cut alfalfa or cut clover with 80 percent crushed oats will prove satisfactory. Combinations of coarse roughage and corn should be avoided. Silage is not a good feed for foals. Allow free access to salt and provide plenty of fresh water. Exercise is very essential to the best growth. Well bred foals are most easily fed and properly developed to produce types that are most satisfactory for work and market purposes.

Raising the Orphan Foal.—Occasionally there is necessity for raising a foal by hand. This may be done successfully by exercising patience and giving careful attention to every detail.

Milk low in butter fat from a cow recently fresh, sweetened with molasses or sugar, diluted with warm water and lime water, constitutes the feed that most closely resembles the mare's milk. A tablespoonful of sugar with warm water enough to dissolve it, 3 to 5 tablespoonfuls of lime water and milk enough to make a pint, would be a proper mixture for this amount. The lime water tends to correct digestive troubles and is very necessary. At first the foal should be fed half a teacupful every hour. Lengthen the feeding periods and increase the amount gradually as the colt gains strength. In a few days feeding six times a day will answer and later four times. When the foal is 5 to 6 weeks old, some skim milk may gradually be added to the feed and feeding periods be reduced to

three daily. Oatmeal at first and then wheat bran should be offered when the colt will nibble it from the hand of the attendant.

In case of scouring reduce the amount of milk and give castor oil treatment. Be careful not to overfeed and lay emphasis on keeping everything sweet and clean.

Care of the Foal's Feet.—Under natural conditions a foal's feet may be expected to grow and develop normally and without the necessity of giving them attention. It is true, however, that bad feet, ankles, and the wrong kind of action often develop as a result of the feet growing unevenly or in the wrong manner.



Well Developed Draft Foals.—*Wisconsin College of Agriculture.*

They should be watched and trimmed whenever there is an opportunity to level them at the bottom or keep them in line with a straightforward action. Do not pare the foot away any more than is necessary and aim to grow all the foot possible.

Training the Foal.—The horse is much more susceptible to training than many people stop to consider. Much of the disposition and habit of a horse and the ease or difficulty with which he is handled is a matter of acquirement. It is, therefore, important that from the beginning the foal be handled and developed in a manner to become most satisfactory and pleasing. Regular lessons in teaching the foal and horse what is expected of him accompanied with firmness and patience, is the most approved system of training. There should be a clear understanding of what the foal is to do. Avoid confusion by not trying to teach too many things at a time. Aim to develop the intelligence and confidence of the

foal rather than to force him into subjection by breaking his spirit and having him obey through fear. Guard against bad habits and do not let them become fixed. Mismanagement and the want of something better to do are the cause of most bad habits in horses. Exercise and a proper amount of work play an important part in the training and development of all classes of horses. At the age when the foal may begin to work, two and a half to three years, be particularly careful not to overwork him. Reserving his strength will result in a more complete development and a longer lifetime of the most satisfactory service.

Age to Castrate Colt.—Castration should be done by one well qualified to do the work and is usually done after the colt is a year old. Too early castration interferes with the development of masculine characteristics that are important in the gelding. Colts should be in a healthy condition at time of castration and exercised or turned to pasture following the operation. There is less opportunity for infection and colts heal faster if turned out to pasture prior to and at time of castration.

The Care and Feed of the Stallion.—Stallions of a better class than the average would greatly increase the value of the horse industry and improve the general character of horses in every community. There should be a community interest in the type and character of the stallions that stand for service within it. Owners of mares should be as much concerned about the care and management of stallions as they are with the care and management of their brood mares and foals.

Four important evils prevent stallions from having the vigor and fertility to insure mares being safely bred and from possessing the ability to impart soundness, strength and longevity to their foals. These evils are hereditary unsoundness and disease, idleness, pampering with the wrong kind of feed, and service at too young an age and in excess. There is no reason why these evils should exist or cannot be avoided. There are plenty of sound, healthy colts of good parentage in the country which if properly reared should make it unnecessary to use anything of secondary class. A community effort and proper appreciation on the part of owners of mares and stallions in selecting and handling stallions would save money, time and disappointment and insure a class of horses and a market for them that would be highly profitable.

Proper Age for Service.—Properly reared and managed, the best service of a stallion is from eight to sixteen years. A two-year-old colt will serve mares without indications of harm at the time, but experienced horsemen claim that in after years he will show undesirable results of it in both himself and his colts. One of the most successful breeders of horses in America advises not to let a colt serve until he is at least four years old and further states that five is better.

Number of Mares Stallion Should Serve.—Commence breeding twenty mares at the proper serviceable age and increase each year at the rate of ten until fifty mares are bred each season, never going beyond this number and never serving more than two mares a day. This should insure a high percentage of mares safely bred, colts of a vigorous, sound character and a long useful lifetime of service on the part of the stallion. Stallions are frequently required to serve 100

or more mares in a season. The results, however, do injustice to the stallion, his foals, his owner and the owners of mares.

Feeding the Stallion.—The greater number of stallions are likely to be overfed at the beginning of the breeding season and poorly fed during their idle season. Pampering the stallion with drugs, stock foods, tonics and unhealthful feeds to fatten and stimulate him is unnecessary and produces unsatisfactory results. Feeding must be a matter of intelligent judgment. It is safe to depend upon bright, clean oats and hay and a bran mash once or twice a week as the condition may seem to warrant. A liberal quantity of oats and bran, two parts of oats and one of bran fed twice a day, and once daily through the breeding season, giving a feed of boiled barley with a little flaxseed cooked with it and fed hot at night, is recommended. Fresh grass is always relished and keeps the bowels in good condition.

Authorities differ on the matter of feeding corn. Some advocate a few ears occasionally, others avoid feeding it. This is evidence that more than one system of feeding may be followed. Stallioners of the older school recommend saltpetre to keep the system clear and to avoid "Monday morning" difficulties. A tablespoonful of saltpetre in the Saturday evening bran mash is the customary practice of many good stallion owners. Intelligent feeders keep the stallion in normal condition throughout the year; feed to have him gain rather than lose weight during the breeding season, avoid radical changes in the system of feeding and do not feed hay or give large quantities of water in the morning to distend the belly and make service difficult.

Dr. Campbell, of the Kansas State Agricultural Experiment Station, suggests the following combination of feeds that might be fed to stallions. The parts are by weight:

Oats; prairie or timothy hay.

Oats 4 parts; corn 6 parts; bran 3 parts; prairie or timothy hay.

Oats 4 parts; corn 6 parts; linseed meal 1 part; prairie or timothy hay.

Corn 7 parts; bran 3 parts; linseed meal 1 part; prairie or timothy hay.

Corn; alfalfa hay; prairie or timothy hay.

He further suggests that one-third alfalfa fed in the morning and two-thirds prairie hay fed at night and corn fed three times a day, is a comparatively cheap and satisfactory ration where alfalfa is grown, and that barley or kafir might be substituted for corn.

The judgment of many stallion owners leads to the conclusion that rations containing oats and a variety of the most wholesome feeds should be seriously considered and provided, especially as the breeding season approaches and advances.

Exercising and Grooming the Stallion.—Daily exercise throughout the year is essential to best results in keeping a stallion. To work him regularly is one of the best means of exercising. Driving, riding and allowing him to run in a paddock daily are other means. He should not be overworked, but kept in a firm muscular form, that gives energy, vigor and health.

Regular and thorough daily grooming does much to insure health and vigor and is all that is necessary under a proper system of feeding to make the stallion the pride of his owner and of the community, in which he does service.

A Precaution in the Use of Stallions.—It is necessary that a stallion be absolutely clean and free from infectious diseases and in no instance should he be allowed to serve mares which are questionable. Mares having a diseased condition of the reproductive organs will not be likely to breed successfully and there is no object in taking a chance on breeding them and infecting the stallion and the mares he serves later.

Buying a Stallion.—An individual or a community of farmers should take into consideration the following suggestions on buying a stallion:

Decide upon the best type and breed of horses for the community.

Arrive at a decision early enough to have plenty of time to make the proper selection.

Consider the number of mares to be bred and buy a horse old enough or enough horses to do the service most successfully.

Buy a proven sire whose colts may be seen if possible.

Buy of reliable breeders nearest by. It will save money and insure the most satisfactory attention to your needs.

Arouse and maintain a community interest in the stallion and in the foals that he will get.

Suggestions for Stallion Owners.—Employ if necessary a regular attendant whose judgment on matters pertaining to horse production will insure the best care of the stallion, and enable him to make many valuable suggestions to owners of mares.

Keep the stallion in a roomy, well lighted, ventilated box stall where sunlight will help to keep it dry and free from filth.

Have the stallion where he can enjoy the company of other horses. It helps to keep him agreeable and easy to control.

See to it that his feet are in the best of condition, level at the sole, not pared down at the sole, frog and bars, or rasped on the outer wall. Shoes that are well fitted should be provided when the stallion is traveled about the country and worked.

Endeavor to conserve the strength and prolong the usefulness of a good stallion as much as possible.

Sterility in Stallions and Mares.—Most stallions are potent and retain their potency to an old age. There may be an inability or an indisposition to serve a mare, however, due to causes resulting in temporary or permanent sterility. Permanent sterility is usually congenital, present at birth, and the result of an incomplete or abnormal development of the reproductive organs. Stallions with both testicles retained in the body undeveloped are usually sterile. Stallions with one testicle developed (ridglings), may be sure breeders, but there will be a tendency for his colts to be in the same condition and it is undesirable to select a stallion of this character.

Temporary sterility is caused by injuries or diseases affecting the reproductive organs and also may be the result of extreme change of environment, overfat condition or rundown condition and excessive use in the stud.

Many instances are known where imported stallions have failed to serve mares successfully for the first year or two in this country after which they proved to be entirely satisfactory. In most instances stallions are sold with a guarantee to get 60 per cent of normal brood mares in foal. A much better result than this may be expected, however, if the stallion is potent and not used to excess.

Mares frequently cause more or less difficulty as a result of their sterile or barren condition. Mares past twelve or fourteen years of age are likely to be sterile due to disuse and changes that have rendered the reproductive organs inactive. Over fat mares are difficult to get with foal. Diseased and closed and hardened condition of the reproductive organs are causes of inability to conceive. Some mares appear to have an inability to produce a foal oftener than once in two years. It is easier to breed mares successfully in the spring of the year than it is in the fall, in fact, the spring when mares are shedding their coats may be regarded as the normal and most successful season to breed them and to have them raise their foals most satisfactorily.

Care and Management of the Work Horse.—The work horse is the ultimate and most important end of the horse industry. He is worthy of every care and comfort that can be given him and the driver and caretaker of the working class of horses have a responsibility equal to that of any other class of men engaged in animal production.

Work Horse Suggestions.—To the fullest extent possible, choose a work horse of the class that is best adapted to the kind of work he must perform. If work for which he is unsuited must be performed, give him extra consideration and every encouragement.

Do not expect young, immature or aged horses to do the work that horses in their prime can do. It is unprofitable to depend upon either for work that is urgent.

Retire from work, horses that are lame, sick or seriously out of condition.

Do not turn off an old horse that has paid his cost and keep many times and let him fall into the hands of men who are inconsiderate of his welfare. Horse hides, bone and meat serve purposes that render it possible to have old horses humanely and profitably destroyed.

As far as possible to do so, keep work horses working regularly to their fullest capacity. It is better for them and much more profitable to their owner. Farm horses are idle during a large percentage of the working days of the year which fact must be taken into consideration in keeping and feeding them to the best advantage.

Guard against diseases by never watering horses at public watering places especially in times of an epidemic of distemper.

Buying the Work Horse.—Judgment and money secure a good work horse. One must expect to pay a reasonable price for a work horse and there is nothing saved in buying something undesirable at a reduced cost. The best is

cheapest in buying, breeding and raising a work horse. If one does not feel confident to judge a work horse, it will pay to hire an expert and get the benefit of his judgment.

Be careful to consider and secure suitable age, sound, serviceable feet, limbs and body, a well balanced straightforward action, a good disposition and a good feeder.

Feeding and Watering the Work Horse.—The character and amount of work a horse is required to do should determine largely the kind and amount of the ration. The system of feeding has more to do in determining one's success in feeding the work horse, than the feed itself. Especially should one bear in mind that the horse is not like the cow or steer and that he performs a different service. The stomach of the horse is not adapted to carrying large quantities of roughage and at the same time permitting the horse to work with ease. The practice should be then to feed grain and a small amount of hay in the morning, grain and very little hay if any at noon, and grain and a liberal amount of hay in the evening when there is opportunity for the horse to eat and digest at his leisure.

Amount of Hay to Feed.—One pound to one and one-fourth pounds of hay per 100 lbs. of body weight may be considered an approximate amount of hay necessary to feed the work horse daily. The hay should be bright, clean quality. While timothy may be regarded the standard roughage for horses, especially in sections where it is commonly grown, it is not necessarily the only good roughage. Prairie hays and hays made from cereal crops like oats, barley and wheat, cut in the milk stage, and southern hays like Johnson grass and lespezea properly cured, may be regarded satisfactory roughages. Thickly grown corn fodder and corn stover well cured and free from mold, provide excellent roughage for horses in winter, and may be used to advantage. It is always best, however, for the work horse to have well cured hay if it is possible to secure it. Straw that is bright and clean may be used to good advantage in winter and will save the hay for later use or for other classes of stock.

Clover and Alfalfa Hay for Horses.—Many condemn the feeding of clover and alfalfa hay to horses. For work horses, however, these hays may be fed to advantage if the amount is limited and the horse is not allowed to eat too much. Horses like these feeds better than other kinds of hay and will be sure to eat more than is good for them if judgment is not used in supplying them proper amounts. A somewhat less amount than 1 pound per 100 lbs. of live weight may be safely fed. Timothy or prairie hay fed in combination with legume hay, make a fine combination.

Silage for Horses.—The following summary statement by E. A. Trowbridge, of the Missouri Experiment Station, indicates the possibility of utilizing silage where careful judgment is used in feeding it:

Corn silage is now being fed with success by a large number of horsemen and farmers to all classes of horses and mules. Horses at hard work need a concentrated ration and should not be expected to eat large quantities of silage.

Corn silage should always be fed in combination with other feeds.

Within the limits of usefulness, it is a cheap substitute for hay and adds variety and succulence to the ration.

Silage is not a success except in the hands of a careful feeder with an eye to the thrift of the animal.

Under no circumstances should spoiled silage, either moldy or rotten, be fed to horses or mules.

Suitable Grain Mixtures for Horses.—Oats are the most common and the safest of all feeds for the horse. They are improved upon for horses doing heavy work by the addition of other feeds. Nine parts of oats and one part of bran by weight with two to four ears of corn thrown in with the mixture at each feeding time, form a suitable feed for horses doing heavy work. Thin horses may be given six ears of corn in addition to the oats and bran.

Corn is commonly fed in the middle and southern states and, when fed with judgment and balanced by feeding it in combination with clover or alfalfa hay or other concentrates relatively high in protein, it may be regarded an excellent feed. Fed on the cob or shelled are usual methods of feeding it. Experiments as well as the practice of the Paris Omnibus Company, indicate that corn and cob meal finely ground is equal to corn alone. The ground cob renders the corn meal less likely to form a heavy mass in the stomach of the horse and thus produce colic.

Corn fed with timothy or prairie hay is best fed in combination with bran and oil meal. A mixture of six parts of shelled corn, three parts of wheat bran and one part of oil meal, proved equal to a ration of oats in trials conducted at the Kansas Experiment Station.

Barley is used on the Pacific Coast for horses. Feeding trials indicate that a slightly greater quantity of barley is required than oats to produce the same results.

Careful judgment on the part of feeders will make it possible to feed a great variety of grains and grain by-products. Care should be exercised in getting combinations that are bulky like oats or the other combinations suggested and that will balance the ration with reference to starchy feeds like corn or barley and nitrogenous feeds like beans, bran and oil meals.

Amount of Grain to Feed.—Farm work horses at hard labor should receive from one and one-fifth to one and one-third pounds of grain per 100 lbs. of live weight per day. This amount will ordinarily maintain their weight. Additional amounts will have to be fed at the discretion of the feeder to increase the body weight if it is desirable to do so. The grain should be fed in three equal feeds morning, noon and night.

Precautions in Feeding Grain.—Horses should be gradually accustomed to grain and the amount governed according to the work and condition of the horse. The grain feed should be reduced one-half on Saturday nights and on idle days, until four days have elapsed, or until the horses have again been put to work, when an increased amount may again be fed. "Monday Morning Diseases," (Lymphangitis) and Azoturia are prevented by carefully adhering to this rule.

Avoid letting horses eat their grain too rapidly by mingling chaffed hay with it or compelling them to nose it out from between round, smooth rocks that have been placed in the feed boxes.

Grinding Grain.—A saving of about ten percent may be made by grinding, crushing or rolling grain for farm work horses when at hard labor. Horses having poor teeth will naturally do better on ground grain. Crushing or rolling renders grain less dusty and it has been found that ground grain fed dry requires twice as long for horses to consume it as when it is thoroughly dampened. How well horses eat and thrive and the expense of grinding or crushing should determine to what extent it pays to grind feed for them. Small, hard grains should be ground to produce satisfactory results.

Watering Horses.—Methods of watering may vary, but a certain order of watering should be followed after a horse has been accustomed to it. Horses that have been without water for a long time should be allowed only a small amount of water at first chance of getting it. It is dangerous to allow a horse when very warm, to gorge himself with water, but a small amount will be refreshing and unharmed. It is well to have horses cool enough upon entering the stable to drink before they are fed and also water them the first thing in the morning.

Providing Salt.—Horses require salt and are fond of it. An ordinary handful supplied on Sunday is a practice that provides a sufficient amount. Horses at hard work require more salt than idle horses. Regularity and not overfeeding at irregular intervals are precautions to be observed in feeding salt. A lump of rock salt kept before the horse at all times is the practice followed by many horsemen.

Grooming, Clipping and Blanketing.—Thorough grooming is as important as feed for the work horse. Removing the waste material that comes from perspiration and keeping the pores of the skin open and clean, insures health as well as a good appearance of the horse. Idle horses do not need the grooming that work horses do. The work horse should be groomed at night sufficiently to enable him to rest well. A scraper to remove perspiration that may be flowing freely will reduce much of the work of grooming. An old broom to sweep fresh mud from the legs as soon as a horse is brought into the stable is also an easy way to reduce the work of grooming. Currying with a curry comb not sharp enough to injure the hide and briskly brushing with a good brush and woollen cloth, improves the appearance of the horse as well as keeps him in fine health and spirit. The curry comb should never be used on the head or on the limbs below the knees and hocks. A stiff, "Dandy" brush or corn brush takes the place of a curry comb for the head, limbs, mane and tail.

In the spring of the year when the coat of hair is heavy and just prior to the time shedding commences, much discomfort can be saved the horse by clipping him. Clipping is most conveniently done by two men and the use of the machine clipper. This will also be the means of saving feed and overcoming danger of overheating, chills, colic and resultant ills. There is little danger from clipping if the horse is properly sheltered and blanketed when not at work.

The driver should regard blanketing during the fall and winter seasons as necessary as he regards the necessity of putting on a coat to keep himself

warm. Blanketing horses in the stable tends to keep their coats in better condition than they otherwise will be, although in stables properly constructed it may not be regarded as a practice that justifies the expense. Horses that are blanketed while in the stable are more susceptible to taking cold when taken out of the stable if they are not carefully blanketed when left standing.

Care of the Harness and Shoulders.—One should be particularly careful to see that the harness properly fits the horse and that the draft or pull against their collar comes as near to being at right angles with the shoulder as possible. Keeping the harness in good repair and properly fitted to the horse overcomes trouble with sore shoulders and makes the work which the horse has to do much easier. The harness should be kept clean especially at points which come in contact with the body. Collars should be pounded and kept soft and smooth. A collar that fits snugly at the beginning of the spring work when perhaps the horse is in high condition of flesh, may be somewhat too large when the horse becomes reduced in flesh. Ordinarily the collar should fit so that there is just room for one's hand between the collar and the lower part of the neck. The use of sweat pads tends to overcome the collar being too large and may offer protection to shoulders that are soft and tender. In all instances they should be kept clean and dry. An extra pair of sweat pads that will enable a dry pair of pads to be used in all instances, will be a good investment. Much of the difficulty from sore shoulders is overcome by working horses early in the spring season to harden their shoulders gradually and have them in good condition before the heaviest work comes on. Bathing the shoulders thoroughly with salt water and drying them thoroughly each day in the early part of the spring season, tends to harden them and overcomes soreness.

Stabling Horses.—In the construction of new barns and in the modification of old barns, there is always opportunity to improve upon the arrangement of stables and conveniences for giving live stock of the various classes the most suitable care and attention. The horse stable should be carefully constructed to afford plenty of air, sunlight and ventilation. Stalls should be arranged in a manner to avoid sunlight shining directly into the faces of the horses. Large, roomy stalls $4\frac{1}{2}$ to 5 feet wide and 10 feet deep, provide roomy stalls in which horses can rest comfortably, and be easily groomed and harnessed. The floors should be constructed to drain properly and keep the bedding and stall as dry as possible. A concrete floor with a rough surface to prevent slipping and a wooden grate immediately under the horse is the most suitable floor. The grate should be so constructed that it can be lifted up and the floor cleaned whenever necessary. Horse stables need not necessarily be as warm as stables for other classes of stock and it is not a good plan to have the horse stable in the same part of the barn with cattle and other classes of stock.

If the horse stable is included in the same barn with cattle, a partition that will separate them is desirable. Horses kept in cow barns which are as a rule much too warm for horses, incur danger of taking cold upon being exposed to cold outdoor weather. The horse stable should be arranged with

a suitable room for hanging harnesses. This affords a saving in keeping harnesses dry and away from the stable atmosphere which contains more or less ammonia that tends to rot the leather.

Where hay chutes are provided and lead from the hay mow to the manger, precautions should be taken to have the opening at the manger large enough to prevent horses getting their heads fast. Getting their heads fast has resulted in their throwing themselves and breaking their necks. Where hay chutes are used, judgment should also be exercised in the amount of hay that is put in the chutes in order to prevent the horses overeating. Stalls should be well bedded with straw, shredded corn stalks, shavings or sawdust. While shavings and sawdust are suitable for bedding, they do not make as good manure for the land as do straw and cornstalks. Horses that are inclined to eat their bedding may be kept in better condition if shavings and sawdust are used for bedding purposes.

MULE PRODUCTION.

The breeding of mules in America dates back to 1878 when the king of Spain presented George Washington with a jack which was used at Mount Vernon and sired mules that sold at high prices. The mule is a hybrid resulting from the cross of the jack and the mare, and will not breed. Jacks from Spain of the Catalonian breed have been the most popular of several breeds used in America for the production of mules. This breed stands 14½ to 16 hands high and possesses style, size, action and hardiness and early maturing quality that combine to make the desirable qualities a jack should possess to sire the best class of mules.

Types of Mules.—The mule is generally smaller than the horse, being 14 to 17 hands high and weighing from 600 to 1,600 pounds. The size of the jack and of the mare determine the type and character of the mule. As a rule, mares of good quality weighing from 1,300 to 1,400 pounds, bred to jacks of good size and quality and action, having heavy bone and long, erect ears, produce mules of the most desirable type. Better prices are usually paid for mare mules than for horse mules. The most desirable color is black with a tan nose and flank. Bay, brown, gray and dun colors are more or less common.

Hughes, in "Successful Farming," makes the following classification of mules bred in America and handled on the markets in mule breeding sections:

CLASSIFICATION OF MULES

Class	Height	Weight	Characteristics
Draft.....	16 -17.2	1200-1600	Large, heavy boned, thick set.
Sugar.....	16 -17.0	1150-1300	Tall with good quality and finish.
Cotton.....	13.2-15.2	750-1100	Small, compact with good quality.
Mining.....	12 -16	600-1350	"Pit" mules, small; "Miners" large and rugged.
Farm.....	15.2-16	1000-1350	Plain and thin, with good constitution.

Adaptability of Mules.—The mule has proved to be a most useful beast of burden and his popularity is increasing. His hardiness, ability to take care of himself and adaptability to most kinds of climate, especially the extremely warm climates, have led people, including many farmers, to regard him more practical to use than the horse. More has been done in America to develop the mule than in any other country. More than one-half of the mules in the world are in the United States. Prices paid for mules compare favorably with those paid for horses, and one should expect to pay fully as much to secure a good pair of mules as he would pay for a good team of horses.

HOW TO TELL THE AGE OF A HORSE.

Names of Teeth.—In a complete set of teeth a horse has forty and a mare thirty-six. They are named as follows: front six on either jaw, (twelve in number) incisors; next tooth on each side of the incisors in a horse, canine or bridle tooth (four in all); next six, double teeth, on each side of both jaws, molars or grinders (twenty-four in number).

Two Sets of Teeth.—A horse has two sets of teeth corresponding to the baby teeth and permanent teeth of a human being. The first set are called milk teeth or temporary teeth and consist of twelve incisors and twelve molars. Half of these are in each jaw. The temporary teeth are whiter, smaller and have a better defined neck at the gums than the permanent ones.

TEETH AT DIFFERENT AGES.

Birth.—At birth a colt has two “nippers” or central incisors on each jaw and three molars. Sometimes these teeth may not break through for a day or two.

Four to Six Weeks.—At this time the lateral incisors break through on both jaws. (The lateral incisor is the tooth on each side of the two central incisors).

Six to Ten Months.—The corner incisors break through when a colt is from six to ten months old. (The corner incisor is the outer incisor in each half of both jaws).

One Year Old.—When a colt is one year old he has a full set of twenty-four temporary teeth.

Two and One-Half Years Old.—At this age the two central incisors are shed and also the fifth permanent molar on each jaw. The first and second molars are replaced by permanent ones. (See Photograph.)

Three Years Old.—The two central incisors are up in wear. (See Photograph).

Three and One-Half Years Old.—The third temporary molar is replaced by a permanent one. The lateral incisors are shed.

Four Years Old.—The permanent lateral incisors are up in wear. (See Photograph)

Four and One-half Years Old.—The corner incisors are shed. In males the “bridle” or canine teeth are also shed.



Fig. 1.—Appearance of the mouth between 2½ and 3 years of age. The center pair of temporary incisors show the hood replaced by permanent teeth at this age. The cut shows a permanent tooth making its appearance at X.



Fig. 2.—The teeth at just 3 years. The gums are inflamed around the second pair of temporary teeth, showing that they will soon be replaced by permanent teeth; when the animal will be considered 4 years old.



Fig. 4.—A five-year-old or full mouth. All of the incisor teeth are permanent, but the corner incisors have not yet come into wear.



Fig. 5.—At 6 years the cups in the center pair of incisors are almost obliterated by the wearing down of the teeth. The remaining teeth show well-defined cups.



Fig. 3.—A typical 4-year-old mouth. The two middle pairs of incisors above and below are permanent. The outside pairs are temporary teeth, the latter being detected by their white appearance and small size.



Fig. 6.—A 7-year-old mouth. The cups show plainly only in the outside pair of incisors in the lower jaw.



Fig. 7—An 8-year-old mouth. The cups are worn out of all the lower teeth.



Fig. 9—A 22-year-old mouth. The incisors meet at an acute angle and the wearing surfaces have a triangular shape.



Fig. 8—A 14-year-old mouth. After 8 years the age is estimated by the angle at which the incisors come together, by their length, and by the shape of the wearing surface. The older the horse the nearer this surface approaches a triangle. It is practically impossible to estimate the age correctly after the cups have disappeared from the teeth.

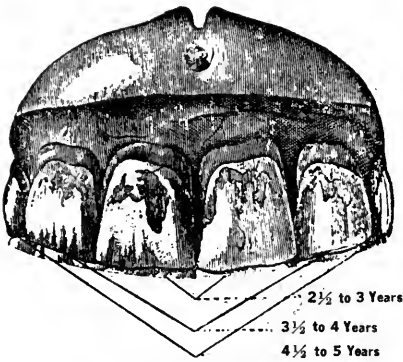
CONDITION OF THE TEETH.

This is one of the first points that should be considered in purchasing a horse or in the care of one. Many a horse becomes weak, poor in condition, and emaciated simply as a result of bad teeth which have been neglected. If the horse turns his head to one side while eating, shows signs of poor nutrition, and passes whole grains of oats or corn with the feces, his teeth need attention.

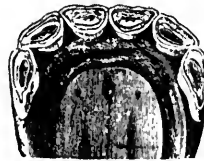
The continual grinding of the teeth in eating causes the outer edges of the upper molars and the inner edges of the lower molars to become sharp. These sharp edges lacerate the thin skin of the inner cheek and the tongue, and make chewing painful. This and irregular teeth tend to cause the animal to imperfectly chew his feed before swallowing it; and unless the teeth receive proper attention, the animal becomes emaciated.

In old animals the teeth often become smooth, making it impossible for them to chew hay and grain. In such cases only soft feeds should be given.

An examination of the teeth may be made by running the hand into the mouth and feeling them to see if they are sharp or if any of them are too long. Only a qualified veterinarian should be allowed to treat the teeth.



Sketch of the permanent incisors, indicating the order in which they appear in pairs. The central pair of permanent incisors in both the upper and lower jaws appear when the horse is about two and one-half or three years of age, the next pair replace the temporary incisors when the horse is about four years of age, and the outside pair, making a full mouth, usually appear at five years of age.

NINE YEARS
UPPER INCISORSTEN YEARS
UPPER INCISORSELEVEN YEARS
UPPER INCISORSFIFTEEN YEARS
LOWER INCISORS

Passing to the permanent incisors in the upper jaw at nine years the central pair have almost completely lost their marks. At ten those adjoining these have reached the same condition, while at eleven the marks have about vanished from all of the permanent incisors. It will be noticed that as the age advances the appearance of the worn tables assumes a more triangular form.

FIVE YEARS
LOWER INCISORSSIX YEARS
LOWER INCISORSSEVEN YEARS
Lower IncisorsEIGHT YEARS
Lower Incisors

FIVE YEARS



TWENTY ONE YEARS

At five years it will be noticed that marks are very distinct and the tables worn but slightly in all of the incisors. At six years the center pair in the lower jaw show some wear, the mark becoming smaller. At seven years the second pair have nearly lost their marks, while at eight the third or outside pair show considerable wear with but a trace of the mark.

Comparison of a five-year-old mouth with one that is twenty years old, showing the marked contrast that develops, as age advances, in the slope of the teeth as viewed from the side. To Goubaux and Barrier's "Exterior of the Horse" the author is greatly indebted for the prints of horses' teeth which have been shown. These have been modified somewhat to bring out more clearly the necessary distinctions.

Five Years Old.—The permanent corner incisors are almost up into wear and the animal has a full set of permanent-teeth. At this age the filly becomes a mare and the colt becomes a horse. (See Photograph)

Six Years Old.—At six years old the cups in the center incisors of the lower jaw are almost obliterated. (See Photograph)

Seven Years Old.—The cups do not show plainly in the teeth of the lower jaw except in the outside pair of incisors. (See photograph)

Eight Years Old.—The cups are worn out of all the lower teeth. (See Photograph)

Nine to Ten Years Old.—The cups disappear from the central incisors of the upper jaw.

Eleven Years Old.—The cups are worn out of the lateral incisors of the upper jaw and remain only in the two corner incisors.

Twelve Years Old.—The cups are worn out of all the upper teeth. The central incisors of the lower jaw are about as thick as they are broad.

Thirteen Years Old.—The central and lateral incisors of the lower jaw are nearly round.

Fourteen Years Old.—The corner incisors of the lower jaw are round and the teeth tend toward the horizontal. (See Photograph)

Twenty-two Years Old.—The central incisors of the upper jaw are triangular and the incisors meet at an acute angle. (See Photograph)

SHOEING AND CARE OF THE FEET.

Nearly all diseases of the feet are the result of improper shoeing and the lack of care of the feet. If the conditions are such that the horn is not worn off faster than it grows and the foot is strong, shoes are unnecessary.

Shoes become necessary when the animal shows signs of the feet becoming sore because of the rapid wearing away of the horn when traveling on hard roads, etc. This may be confined to the front feet only and will disappear when shoes are applied to their feet. For ordinary purposes simple plates, without calks and just heavy enough to prevent bending, are better.

Shoes with sharp calks are necessary when the roads are slippery and when heavy pulling requires that the horse get a grip which will enable him to stand.

Extra heavy shoes are sometimes required on the front feet of draft horses, and often a horse is shod to suit some abnormal condition of the foot such as the high-heeled shoe to give relief in bone spavin, or the barred shoe for horses subject to corns.

Shoe Fitting.—All loose horn should be removed. Care must be taken to keep the sole of the foot perfectly level for otherwise injuries to the joints may result. The frog should be left in its normal shape and size and the bars should not be cut away. The shoe must be the exact size and shape of the foot after the foot is trimmed to its normal form. The shoe should be fitted cold, never hot; the nails should be small and when driven out well down on the hoof. After the shoe is fastened clinch the nails by imbedding them slightly in the hoof with a hammer and smoothing them off with a rasp. The outside

of the hoof should never be rasped. Shoes should be reset every five or six weeks if the feet are to be kept in a normal condition. For all defects such as interfering, overreaching and other defects in gait consult a first-class horseshoer.



Fig. 1.—Arrangement of ropes to throw a horse.



Fig. 2.—Throwing a horse.



Fig. 3.—Holding a horse down.

THROWING OR CASTING A HORSE.

Side-line Method.—Take a three-fourths inch rope about forty feet long, double it at the center and tie to make a loop about two feet long. Slip this loop over the horses neck like a collar letting the knot come at the top of the neck. Pass the two loose ends down either side of the horse, around the hind leg under the fetlock joint and back through the collar. Now with one

man at the animal's head and one holding each rope, slowly back the horse. The men holding the ropes pull them tight and this draws the animal's legs forward and up to his sides throwing him. His legs should be tied in this position to hold him down. This method is especially valuable for throwing young horses for castration as their hind legs are forward and out of the way.

One-man Method.—Take up the "off" foreleg with a strap. This can be done by passing the strap over the animal's back and holding it on by putting a surcingle on and tying the strap to this. Hold the foot up with one hand and draw the horse's head to his shoulder (away from the foot that is up) with the other. This throws the animal to the side with the foot raised. The operator should get on the side close to the horse's head as it goes down to keep him from getting up.

Hobble Method for Old Horses.—Put a strap with a ring on each leg just below the fetlock joint. Pass a rope or chain through these rings and draw the horse's feet together until he loses his balance and falls. Use this method on horses over ten years old. If old horses are thrown with side lines they are liable to injure their backs by struggling.

Preparation for Throwing.—To avoid injury to the horse pick out a level place in which to throw him. Have a folded blanket ready to put under his head while down.

CARE OF THE SICK AND INJURED.

A sick or injured horse should be put in a box stall if one is available. In case there is no box stall put the animal in a wide, comfortable stall as far away from the other horses as possible, where he can be made comfortable and it will be quiet. His stall should be clean, and free from drafts.

Making Patient Comfortable.—The patient should be made as comfortable and contented as possible. The stall should be kept clean and tidy. The floors should be scraped often. The stall should be well ventilated as pure air is essential to a speedy recovery. It should be kept at a comfortable temperature and should be dry. All disagreeable odors of medicine should be eradicated. If the patient can lie down he should have a good bedding of dry, fine, loose litter. If he eats this bedding he can be bedded with moss or sawdust. Unless it is necessary from the nature of the disease to have the stall dark, enough light should be admitted to make it cheerful. A horse suffering from a nervous disease must not be excited. One person should do all the doctoring to avoid frightening him. After the patient is fed any food that remains should be immediately removed or it will make him lose what little appetite he may have if it is left. He should always have pure clean water where he can get it without effort. Even when he is not thirsty he enjoys washing his mouth out with the water. If hay is fed it should be the best and should be clean. If a horse has colic he should have plenty of space in which to roll over.

Blankets and Bandages.—It may be necessary to protect the patient from drafts with blankets. This can be done by putting blankets on him or by

hanging them up to enclose the stall. In putting them on the horse keep them well forward and tied under the chest and in hanging them up to enclose the stall be sure sufficient space is left for ventilation. The blankets should be woolen and their weight carefully adapted to the weather. The extremities may be protected with light woolen bandages after being rubbed lightly to increase the circulation. In applying a bandage take a strip of woolen cloth about three inches wide and six feet long, roll it into a neat roll and begin wrapping the part at the bottom winding upward. With a little practice a good bandage can be put on in this way. If a liniment is applied to a part after it is bandaged care should be taken to prevent its blistering.

Slings.—It is often necessary to place a sick or injured horse in slings. A sling can be made from a wide piece of stout canvas or from wide straps. It is supported from above by means of a chain and tackle. This enables the patient to rest his legs and still be in an upright position. It is seldom necessary to carry the whole weight of the animal in using a sling. It is better to place the sling under him so he can settle his weight into it when his legs are tired or stand on his legs at will. Remember to so adjust the sling as to have it fit closely behind the elbows and throw the animal's weight on his chest and not on his abdomen.

Side Supports.—Side supports are often very beneficial to the patient that is unable to lie down. These should be placed in about the same position that the shafts would come. It may also be well to place one in front of his breast and one in back of him, in case he is injured behind. Such supports should be wound with clothes to protect the animal.

Food for Sick Animals.—It is very important to know what and how to feed a sick animal if he is to make the speediest recovery possible. As a rule the main thing is to preserve the animal's strength. If the patient can eat he should be given cooling, laxative, nutritious but not bulky foods. This will keep his bowels free and open. Food should not be forced upon an animal. It should be prepared attractively so as to tempt him to eat. In case it is refused, the food should be at once removed and offered again in a short time. Do not force the animal to eat unless recovery depends upon his conservation of strength alone. Medicine should not be given in the food if it spoils the flavor for the patient. The following make excellent foods for sick animals: roots such as carrots, good fresh grass, apples (fed from the hand), milk, gruels and bran mash. Gruels and mash may contain dry or boiled oats, raw eggs (beaten), bran and ground oats mixed in cut hay and wet with cold water. To make a gruel stir about a quart of oatmeal or cornmeal into a gallon of cold water and let it soak for an hour. To make a bran mash add some salt to about five quarts of bran. Put this into a pail and cover with boiling water. Cover the pail with cloths to keep in the steam and to keep it warm. It is well to add a few oats to the mash if necessary to tempt the horse to eat.

Giving a Horse Medicine.—Medicine is given to horses in the form of a drench, in the form of pills or with a small syringe.

The Drench.—To drench a horse his head must be drawn up high enough to make the medicine run down but not too high. The head can be easily raised by means of a rope, a loop of which is passed back of the incisor teeth of the upper jaw. The end is then passed under the nose band of the halter and through a pulley or over a beam. The medicine is given in liquid form from a strong glass bottle such as a wine or whiskey bottle. It is poured in slowly at a corner of the animal's mouth.

How to Make a Horse Swallow Medicine.—If the horse refuses to swallow pour a teaspoonful of water into one of his nostrils. This will make him take the medicine.

Pills or Balls.—To give medicine in the form of a pill or ball hold it in the tips of the three middle fingers of the right hand. Grasp the tongue of the horse with the left hand and pull it well forward, turning the tip of the tongue towards the roof of the mouth. Next insert the right hand and push the pill far back past the bulge in the tongue. Withdraw both hands quickly and the medicine will go down.

The Syringe.—The syringe makes a fine way to give medicine to a horse. One can get a small hard rubber syringe for this purpose. The syringe is held in the right hand while the animal's mouth is opened with the left and the medicine is forced into the back part of the mouth. Medicine can be given quickly and easily this way.

Action of Drugs in Horses.—(See "Cattle Department.")

CASTRATION.

This consists in removing the organs of generation of the males. Colts are generally castrated when a year or two years old. If a colt is not well developed it is better to let him go until he is three years old. Colts should not be castrated when it is exceedingly hot or cold or when the flies are bad. The best time is generally in the spring when the pastures are good and the weather cool.

The colt to be castrated should be thrown on his left side or stood with his side to a wall and restrained by a twist on his nose. The scrotum or testicle sack should be washed clean and antiseptics used. Remove the smaller testicle first. The scrotum should be firmly grasped below the testicles and the testicles squeezed against the skin until it is tight. Next a bold incision is made close to the line dividing the scrotum in the center and well forward. This cut should be long enough to allow the testicle to drop out easily and allow sufficient drainage. The cord should be cut at least four inches from the testicle to prevent a tumor forming. Among the ways of severing the cord are by tying the cord with a strong but small string and cutting the testicle with a knife close to the string, and by using the emasculator or *ecraseur*, instruments designed for that purpose.

A colt should rest for some time after being castrated; then he should have light exercise to remove the blood clots that collect in the scrotum. His bowels should be kept open with injections of glycerine and warm water and the wound should be bathed with antiseptics.

Swelling after Castration.—In case the scrotum swells badly after the colt is castrated and the animal does not eat well he should be looked after. Infection due to a lack of cleanliness during the operation; confining the colt in dirty stables after being castrated.

Treatment.—Put the colt in clean quarters or better let him run in a good pasture. Give him plenty of exercise and a tablespoonful of saltpeter (to a two-year old) once a day for three or four days. Be sure the kidneys are active and the bowels well opened. Dip the finger in disinfectant and open the wound in case it needs draining. Twice every day it is well to inject a solution of carbolic acid into the sack. Use it one part to thirty of water. It will help relieve the pain if you wash the sack with hot water.

Throw cold water upon the loins and the parts. This usually stops the bleeding quickly.

Apply vinegar to the parts after washing them well with salt water.

It is said that a string tied tightly around the tail will stop bleeding from castration in a short time.

HOW TO LOCATE LAMENESS.

Below we give the indication of lameness in each different part of the horse in the simplest way possible, so as to make a handy reference when an animal goes lame.

In locating lameness remember the following:

1. A horse that walks lame will always trot very lame. Lameness is best shown in a slow trot.
2. One should not jump too hastily to a conclusion as to the location of the lameness. Rather than put a blister on the wrong place he might better delay until the indications are more prominent.
3. The horse should be trotted immediately upon leaving the stable.
4. The lame foot should be examined closely as a horse may be lame in two places at the same time.
5. Lameness seldom exists any length of time without some inflammation, but a stone in the foot may be very painful to the animal before any great heat can be perceived.
6. In examining the foot, the shoe should be removed, the nails should be examined for signs of pus or blood and the bottom of the foot cleaned and gone over for punctures or bruises.
7. Horses are likely to flinch when their shoulders are pressed firmly. This should not mislead.
8. To determine heat, aside from the touch, one may wet the corresponding parts on each leg. The leg drying first is the one heated.

Location.**Indications.****In the Leg.**

When Standing.—Pastern of lame leg held more upright than others; resting leg more often and longer than others; lying down unusually long; heat, swelling or pain in some part of leg, (discovered by handling and moving it).

When Trotting Slowly.—Lame foot is lifted more quickly than others and less weight is put upon it, making a different noise as the foot hits the ground. (Turning the animal sharply to the left or right so as to bring the weight alternately on the right and left legs generally increases any signs of lameness.)

In One Forefoot.

When Standing.—One forefoot held far in advance of the other, indicates soreness in back part of leg; resting the toe on the ground, bending the fetlock and knee, both forefeet being about even.

When Trotting Slowly.—Head and forequarter raised on lame side as forefoot comes to the ground but drops on well side. Caution: Do not mistake this for lameness behind because of the depression in the opposite hind hip.

In Both Forefeet.

When Standing.—Both forefeet kept in advance of the body, horse resting on heels; hind legs held well under body; changes position often; shoulders held upright and stiff; head held high; loins arched; hind feet held well under the body.

When Trotting Slowly.—Takes short steps and puts feet down carefully.

In One Hind Leg.

When Standing.—Lame foot held in advance. (Indicates soreness low down).

When Trotting Slowly.—Lame hip raised higher than opposite one; lame foot put down carefully.

In Stifle.

When Trotting Slowly.—Drags toe.

In Hip.

When Trotting Slowly.—Drags leg on lame side and trots out of alignment.

In Both Hind Quarters.

When Standing.—Forefeet well under the body.

When Backing.—Backs up with difficulty.

In Both Legs on Same Side.

When Trotting Slowly.—Never trots squarely, ambles instead; drops heavily on well side.

Deep Seated.

No pain, heat or swelling discovered by handling and moving.

BLEMISHES POSSIBLE ON A HORSE.

- | | |
|--|--|
| 1. Short ear. | 34. Shoe boil. |
| 2. Drooping ear. | 35. Flank or ventral hernia. |
| 3. Pus from nose. | 36. Stifle lameness. |
| 4. Saliva caused by wound. | 37. Farcy buds. |
| 5. Loose lip partially paralyzed. | 38. Bog spavin. |
| 6-8. Fistula of jaw. | 39. Bone spavin. |
| 7. Salivary fistula. | 40. Inflamed skin on hock joint called Sallenders. |
| 9. Blind eye. | 41. Navel rupture. |
| 10. Bony tumor. | 42. Inguinal hernia. |
| 11. Ewe neck. | 43. Bursal enlargement. |
| 12. Goitre. | 44. Rings on hoof. |
| 13. Enlarged jugular vein. | 45. Sand crack. |
| 14. Swelling of paroted gland. | 46. Small thigh. |
| 15. Poll evil. | 47. Capped hock. |
| 16. Itch or mange. | 48. Thoroughpin. |
| 17. Fistula from improper bleeding. | 49. Blood spavin. |
| 18. Farcy. | 50. Curb. |
| 19. Swelling of breast glands. | 51. Wind galls. |
| 20. Abscess. | 52. Big leg. |
| 21. Enlarged fetlock joint. | 53. Quittor. |
| 22. Ridge in hoof. | 54. Flat foot. |
| 23. Poorly formed pastern. | 55. Grease heel. |
| 24. Ox foot. | 56. Hair off tail called Rat-tail. |
| 25. Quarter crack. | 57. Drooping rump. |
| 26. Gall on fetlock joint. | 58. Wasting of muscles. |
| 27. Thickened tendons. | 59. Pointed hip. |
| 28. Splint. | 60. Eel back. |
| 29. Enlargement of the knee. | 61. Saddle gall. |
| 30. Mud fever. | 62. Sway back. |
| 31. Stilt foot. | 63. Fistulous withers. |
| 32. Contracted hoof. | 64. Saddle gall. |
| 33. Inflamed skin on knee called Mallenders. | |

DISEASES OF HORSES

GENERAL SYMPTOMS.

Abdomen sensitive to pressure; pain continuous in bowels; high fever; pulse hard and rapid; horse hates to lie down and before doing so stands with feet together, legs partially bent and hesitates before going down.—**Inflammation of the Bowels, Page 163.**

Afterbirth is detached within a few hours after foaling.—**Removing Placenta.**
Appetite changeable; hair rough; signs of ill health; passage of worms.—**Intestinal Worms, Page 167.**

Appetite gone; sluggishness; pawing now and then; general uneasiness.—**Indigestion, Page 167.**

Breathing difficult; perspiring freely; trembles violently if forced to go; staggers and seems unconscious until he falls; attack usually occurs when the horse is exercising soon after feeding.—**Stomach Staggers, Page 177.**

Breathing labored; nostrils standing open because of double hitch in breathing; often a deep moist cough and frequent discharges from the nose; cannot work hard without stopping frequently to breathe.—**Heaves, Page 167.**

Breathing quickened; cough; chill followed by a fever which increases gradually; rapid pulse; rattling sound in the lungs detected by putting the ear to the chest.—**Pneumonia, Page 171.**

Belly.—Swelling of before foaling.—**Dropsy, Page 163.**

Bleeding from cracks and chaps on back part of pastern in cold weather; hollow of pastern is swollen.—**Scratches, Page 175.**

Bone broken and displaced; part cannot be used; a grating sound can be heard when the bone is moved; the broken bone may be felt; pain and swelling.—**Fractures, Page 166.**

Bones of head becoming larger and lighter; face full and round; later the legs are affected and there is some inflammation.—**Big Head, Page 153.**

Bowels move often and pass a thin, watery manure.—**Diarrhea, Page 162.**

Breathing with a roaring or whistling sound.—**Roaring, Page 173.**

Bunch.—Bony bunch usually on side of joint; severe lameness; pastern joint swollen, heated, tender.—**Ringbone, Page 173.**

Bunch on back of hock following some inflammation of part; sometimes lameness.—**Curb, Page 162.**

Cavity in the flesh from which issues pus for a long time; does not heal readily.—**Fistula, Page 163.**

Chill followed by fever; great pain; pulse full and hard; movement difficult and stiff; walks on heels.—**Founder, Page 164.**

- Chills followed by fever; the glands inside of the leg are swollen and sore; manipulation of leg causes pain; leg enlarged.—**Big Leg, Page 153.**
- Chill followed by fever; pulse full and rapid; short, dry, husky cough; bowels constipated.—**Bronchitis, Page 159.**
- Chill followed by fever which increases gradually for a time; quickened breathing; rapid pulse; cough; rattling sound in the lungs which can be detected by placing the ear to the chest.—**Pneumonia, Page 171.**
- Coffin-joint is not bent when walking and horse points the affected foot out while standing; lameness that may be worse when exercised; stands on toes when possible; excessive pressure produces pain.—**Coffin-joint.**
- Consciousness lost; stops; pants violently; falls; breathes slow; pulse weak; heart beats irregular.—**Sunstroke, Page 179.**
- Cough; chill followed by a fever which increases gradually; quickened breathing; rapid pulse; rattling sound in the lungs detected by putting the ear to the chest.—**Pneumonia, Page 171.**
- Cough dry, short and husky; pulse full and rapid; chill followed by fever; bowels constipated.—**Bronchitis, Page 159.**
- Cough.—Often a deep moist cough and frequent discharges from the nose; horse cannot work hard without stopping frequently to breathe; labored breathing; nostrils standing open because of double hitch in breathing.—**Heaves, Page 167.**
- Coughing; throat swollen; some fever; swallowing difficult; water runs out through the nose when drinking.—**Sore Throat, Page 175.**
- Crack in the wall of the hoof extending downward or upward; severe lameness.—**Quarter Crack, Page 172.**
- Cracks and chaps extend in all directions on back of pastern; hollow of pastern is swollen; red and tender; bleeding in cold weather.—**Scratches, Page 175.**
- Discharge from the nose that is thin and colorless becoming thicker and darker as the disease progresses; pimples on the lining of the nostrils; glands under the jaw large and tender; general weakness.—**Glanders, Page 166.**
- Discharge of foul smelling pus from crack in horny frog of foot; hoof dry; heel feverish; tenderness and lameness more noticeable when foot hits hard object.—**Thrush, Page 180.**
- Discharge of pus from a cavity in the flesh often continuing for long periods; does not heal easily.—**Fistula, Page 163.**
- Discharges of a whitish slimy nature that give off an offensive odor; signs of general debility.—**Whites, Page 180.**
- Discharge that is thick from eyes; eyes red; throat sore; high fever; constipation; weakness; poor appetite; head hangs; watery discharge from lining of nose.—**Pink Eye, Page 171.**
- Dry, scanty and hard manure; mild colicky pains which may become severe if condition is not relieved.—**Constipation, Page 161.**

Dull and listless appearance of animal; loss of appetite; fever; eyes watery and discharge from nostrils; throat usually swells and an abscess forms under lower jaw.—**Distemper, Page 162.**

Ears and legs of mare are cold; some fever; bowels constipated; secretion of milk small; may be some inflammation of the udder.—**Milk Fever, Page 93.**

Eating impossible; jaw muscles firmly contracted; stiff muscles hard; sweats profusely; head elevated; nose protrudes; easily excited; "haw" drawn across corner of eye; usually stands.—**Lockjaw, Page 169.**

Eating with difficulty; spitting food out; holding head to one side; slobbering when drinking; loss of flesh; swelling on side of face or under lower jaw; pus often discharges from swelling.—**Abnormal Teeth.**

Elbow has swelling that is soft and flabby and contains a watery fluid. It increases in size and becomes hot and tender.—**Shoe Boil, Page 175.**

Eye.—"Haw" drawn across corner of eye; head elevated; sweats profusely; muscles of body hard and stiff; jaw held shut; cannot eat; nose protrudes; easily excited; horse usually stands.—**Lockjaw, Page 169.**

Eyes inflamed and have thick discharge; head hangs; loss of appetite; weakness; constipation; high fever; watery discharge from lining of nose; sore throat.—**Pink Eye, Page 171.**

Eyes red and inflamed; lids swollen sometimes; profuse discharge of tears and mucus; strong light irritating.—**Sore Eyes, Page 96.**

Eyes watery and discharge from nostrils; animal dull and listless; poor appetite; fever; throat usually swells and an abscess forms under lower jaw.—**Distemper, Page 162.**

Face of horse full and round; bones of head larger and lighter than usual; later the legs are affected and there may be some inflammation.—**Big Head, Page 153.**

Falling insensible after stopping; throwing head up; acting stupid; reeling and staggering; soon gets up as if nothing had happened; sometimes horse only stops, gives a few convulsive movements of his head and shivers.—**Blind Staggers, Page 158.**

Fetlock-joint held forward past its normal position.—**Knuckling, Page 169.**

Fever high; pulse hard and rapid; pain continuous in bowels; flank is sensitive to pressure; horse hates to lie down and before doing so stands with his feet together; legs partially bent and hesitates before going down.—**Inflammation of the Bowels, Page 163.**

Flank.—Horse looks toward flank; pain moderate but continuous; lies down often or stands stretched out as if to urinate.—**Indigestion, Page 167.**

Flank if pressed causes horse to flinch; pain continuous in bowels; high fever; pulse hard and rapid; horse hates to lie down and before doing so stands with his feet together, legs partially bent and hesitates before going down.—**Inflammation of the Bowels, Page 163.**

Food spit out when eating; eating with difficulty; holding head to one side; slobbering when drinking; loss of flesh; swelling on side of face or under lower jaw; pus often discharged from swelling.—**Abnormal Teeth.**

Foot pointed out when standing; coffin-joint is not bent when walking; lameness that is worse when exercised; stands on toes when possible; excessive pressure produces pain.—**Coffin-joint Lameness.**

Going down of hind parts; perspiration profuse; muscles trembling, swollen and stiff; hind quarters lame and stiff; difficulty in moving; urine dark in color; animal makes unsuccessful efforts to get up.—**Azoturia, Page 152.**

Hair comes off in patches; skin rough and scaly; severe itching. Usually affects head and neck first.—**Mange, Page 170.**

Hair rough; appetite changeable; signs of ill health; passage of worms.—**Intestinal Worms, Page 167.**

Hard, dry and scanty manure; mild colicky pains which may become severe if condition is not relieved.—**Constipation, Page 161.**

Head elevated; sweats profusely; muscles of body hard and stiff; jaw held shut; cannot eat; nose protrudes; easily excited; "haw" drawn across corner of eye; horse usually stands.—**Lockjaw, Page 169.**

Head full and round; bones of head larger and lighter than usual. Later the legs are affected and there is some inflammation.—**Big Head, Page 153.**

Head hangs; loss of appetite; weakness; constipation; eyes become very red with a thick discharge; high fever; water discharge from lining of nose; sore throat.—**Pink Eye, Page 171.**

Head held to one side; eating with difficulty; spitting out food; slobbering when drinking; loss of flesh; swelling on side of face or under lower jaw; pus often discharged from swelling.—**Abnormal Teeth.**

Head has a painless swelling on top of it at first; later there is some pain and the swelling is full of pus; there is a feverish condition of the parts.—**Poll Evil, Page 172.**

Head thrown up; horse stops, seems stupid; staggers; reels; may fall down for a few minutes insensible and then get up, shake himself and act as if nothing had happened; at other times the horse stops and only gives a few convulsive movements of the head and shivers.—**Blind Staggers, Page 152.**

Head turned toward flank; pawing; severe pain coming on suddenly, letting up then returning; breathing rapid.—**Spasmodic Colic, Page 176.**

Heart beats irregular; consciousness lost; horse stops; pants violently; falls; breathes slowly; pulse weak.—**Sunstroke, Page 179.**

Heat.—Coming in heat again is proof that mare has aborted. In early months there is usually no warning before an abortion has taken place.—**Abortion, Page 152.**

Heels walked on; chill followed by fever; great pain; pulse full and hard; movement difficult and stiff.—**Founder, Page 164.**

- Hock is inflamed on back side and a bunch soon forms in seat of inflammation; sometimes lameness.—**Curb, Page 162.**
- Hock joint has a puffy swelling on front part.—**Bog Spavin, Page 158.**
- Hind-leg jerked up spasmodically when horse walks.—**Stringhalt, Page 178.**
- Hindquarters lame and stiff; trembling of the muscles; profuse perspiration; difficulty in moving; often hind parts go down before horse can be moved to stable; muscles swollen and rigid; animal makes unsuccessful efforts to get up; urine dark in color.—**Azoturia, Page 152.**
- Inflammation at back part of hock followed by a bunch on the part; sometimes lameness.—**Curb, Page 162.**
- Itching severely; skin rough and scaly; hair comes off in patches. Usually affects the head and neck first.—**Mange, Page 170.**
- Jaw held shut by firmly contracted muscles; impossible to eat; sweats profusely; muscles hard; head elevated; nose protrudes; easily excited; "haw" drawn across corner of eye; horse usually stands.—**Lockjaw, Page 169.**
- Joint at the fetlock held forward past its normal position.—**Knuckling, Page 169.**
- Joint swollen following a wound on the leg in which there is a slippery fluid; joint inflamed; horse becomes very lame; fever; loss of appetite; intense pain; as the inflammation increases the fluid becomes darker and may contain pus.—**Open Joint, Page 170.**
- Knuckling forward at fetlock-joint throwing the joint forward past its normal position.—**Knuckling, Page 169.**
- Lameness and some inflammation at back part of hock, followed by a bunch or thickening of the part.—**Curb, Page 162.**
- Lameness, and tenderness, more noticeable when foot hits a hard object; slight discharge of foul smelling pus from crack in horny frog; hoof dry; heel feverish.—**Thrush, Page 180.**
- Lameness improving with exercise; soreness and small swelling just at the bottom and inside the hock joint towards the front; holds foot forward bending hock joint when standing.—**Bone Spavin, Page 158.**
- Lameness severe at first; pus discharged over top of hoof.—**Gravel.**
- Lameness, severe; crack in the wall of the hoof extending downward or upward.—**Quarter Crack, Page 172.**
- Lameness severe especially when on hard roads; leg held loose when standing; dark spot found where corn is located. This spot generally contains pus and causes pain when pushed.—**Corns, Page 161.**
- Lameness severe; pastern joint swollen, heated, tender; bony bunch usually on side of joint.—**Ringbone, Page 173.**
- Lameness sometimes; small swelling on inside of fore leg.—**Splint, Page 176.**
- Lameness that is worse when exercised; coffin-joint is not bent when walking; stands on toes when possible; excessive pressure produces pain; points affected foot out when standing.—**Coffin-joint Lameness.**
- Leg enlarged; glands inside of the leg swollen and sore; manipulation of leg causes pain; chills followed by fever.—**Big Leg, Page 153.**

- Leg held loose when standing; lameness severe especially when on hard roads; dark spot found where corn is located. This spot generally contains pus and causes pain when pressed.—**Corns, Page 161.**
- Leg.—Hind leg usually drags; swelling little below stifle-joint; muscles appear cramped.—**Stifled, Page 177.**
- Legs and ears of mare are cold; some fever; bowels constipated; secretion of milk small; may be some inflammation of the udder.—**Milk Fever, Page 93.**
- Leg swelling on inside just below the knee; an abscess may form.—**Bruised Knee.**
- Looking toward flank; pain moderate but continuous; lies down often or stands stretched out as if to urinate.—**Indigestion, Page 167.**
- Manure scanty, hard and dry; mild colicky pains which may become severe when condition is not relieved.—**Constipation, Page 161.**
- Manure thin and watery; bowels move often.—**Diarrhea, Page 162.**
- Milk secretion small; ears and legs cold; some fever; bowels constipated; may be some inflammation of the udder.—**Milk Fever, Page 93.**
- Mouth inflamed; discharge of saliva; sometimes frothy; tongue swollen sometimes; eating difficult.—**Sore Mouth, Page 96.**
- Mouth slavers; swallowing frequently attempted; neck arched; often makes peculiar noise.—**Choking, Page 80.**
- Moves hind quarters with difficulty; nose often turned towards flank; high fever; colicky pains; frequent and scanty passage of urine that is dark and thick.—**Inflammation of the Kidneys, Page 167.**
- Mucus.—Profuse discharge of tears and mucus from eyes; eyes red and inflamed; lids swollen sometimes; strong light irritating.—**Sore Eyes, Page 96.**
- Muscles appear cramped; lump or swelling little below stifle-joint; hind leg usually drags.—**Stifled, Page 177.**
- Muscles of body hard and stiff; jaw held shut; cannot eat; sweats profusely; head elevated; nose protrudes; easily excited; "haw" drawn across corner of eye; horse usually stands.—**Lockjaw, Page 169.**
- Muscles of shoulder waste away; skin seems to grow to bone; muscles on outside of shoulder blade seem to disappear.—**Sweeny, Page 179.**
- Neck arched; mouth slavers; swallowing frequently attempted; often makes peculiar noise.—**Choking, Page 80.**
- Nose has thin colorless discharge becoming thicker and darker as the disease progresses; pimples on the lining of the nostrils; glands under jaw large and tender; general weakness.—**Glanders, Page 166.**
- Nose has watery discharge from its lining; eyes inflamed and have thick discharge; head hangs; poor appetite; weakness; constipation; high fever; sore throat.—**Pink Eye, Page 171.**
- Nose often turned towards flank; moves hind quarters with difficulty; high fever; colicky pains, frequent and scanty passage of urine that is dark and thick.—**Inflammation of the Kidneys, Page 167.**

- Nose turned toward flank; severe pain coming on suddenly, breathing rapid; pain stops for a short time but soon returns.—**Spasmodic Colic, Page 176.**
- Pain coming on suddenly; severe pain; turns nose toward flank, and paws; breathing rapid; pain stops for a short time but soon returns.—**Spasmodic Colic, Page 176.**
- Pain continuous in bowels; fever high; pulse hard and rapid; horse hates to lie down and before doing so stands with feet together, legs partially bent and hesitates before going down; sensitive to pressure on abdomen.—**Inflammation of the Bowels, Page 163.**
- Pain great; chill followed by fever; pulse full and hard; movement difficult and stiff; walks on heels.—**Founder, Page 164.**
- Pain suffered by horse; looks toward flank; lies down often or stands stretched out as if to urinate; pain moderate but continuous.—**Indigestion, Page 167.**
- Pains which assume a colicky nature; moves hind quarters with difficulty; nose often turned towards flank; high fever; frequent passage of urine that is dark and thick.—**Nephritis, Page 170.**
- Panting violently; stopping; loses consciousness; falls; breathing slow; pulse weak; heart beats irregular.—**Sunstroke, Page 179.**
- Paralysis of different parts.—**Paralysis, Page 170.**
- Part cannot be used; displacement of broken bone; a grating sound can be heard when the bone is moved; the broken bone may be felt; much pain and swelling.—**Fractures, Page 166.**
- Pastern.—Hollow of pastern is swollen, red and tender; cracks and chaps extend in all directions and often bleed in cold weather.—**Scratches, Page 175.**
- Pastern-joint swollen; heated, painful; severe lameness; bony bunch usually on the side of the joint.—**Ringworm, Page 95.**
- Pains which appear colicky and may be severe if condition is not relieved; manure scanty, hard and dry.—**Constipation, Page 161.**
- Patches of hair come off; skin rough and scaly; severe itching. Usually affects head and neck first.—**Mange, Page 170.**
- Pawing and turning nose toward flank; severe pain coming on suddenly; breathing rapid; pain stops for a short time but soon returns.—**Spasmodic Colic, Page 176.**
- Pawing now and then; sluggishness; no appetite; general uneasiness.—**Indigestion, Page 167.**
- Perspiration profuse; muscles trembling, swollen and stiff; hind quarters lame and stiff; difficulty in moving; urine dark in color; often hind parts go down before horse can be moved to stable; animal makes unsuccessful efforts to get up.—**Azoturia, Page 152.**
- Perspiring freely; breathing difficult; trembles violently; if forced to go staggers and seems unconscious until he falls; attack usually occurs when the horse is exercised soon after feeding.—**Stomach Stagers, Page 177.**

- Pimples on the lining of the nostrils; nose has thin colorless discharge becoming thicker and darker as the disease progresses; glands under jaw large and tender; general weakness.—**Glanders, Page 166.**
- Puffy swelling on front part of hock joint.—**Bog Spavin, Page 158.**
- Puffy swelling on inside and outside of leg just in front of large tendons. By pressure the joint oil is forced from side to side.—**Thoroughpin, Page 180.**
- Puffy swelling on leg, usually on the outside just above the fetlock-joint.—**Wind Puffs, Page 181.**
- Pulse full and rapid; chill followed by fever; short, dry, husky cough; bowels constipated.—**Bronchitis, Page 159.**
- Pus discharged from a cavity in the flesh for long periods; does not heal readily.—**Fistula, Page 163.**
- Pus discharged from crack in horny frog of foot; pus foul smelling; hoof dry; heel feverish; tenderness and lameness more noticeable when foot hits hard object.—**Thrush, Page 180.**
- Pus found in a dark spot on hoof; affected leg held loose when standing; lameness severe especially when on hard roads. The dark spot usually contains pus and causes pain when touched.—**Corns, Page 161.**
- Pus discharged over top of hoof; severe lameness.—**Gravel.**
- Rapid and full pulse; chill followed by fever; short, dry and husky cough; bowels constipated.—**Bronchitis, Page 159.**
- Rattling sound in the lungs detected by putting the ear to the chest; cough; chill followed by a fever which gradually increases; quickened breathing; rapid pulse.—**Pneumonia, Page 171.**
- Reeling; head thrown up; seems stupid; staggers; may fall insensible and then get up as though nothing had happened; sometimes horse only stops, gives a few convulsive movements of his head and shivers.—**Blind Staggers, Page 152.**
- Roaring or whistling sound with each inspiration of air, especially when exercised.—**Roaring, Page 173.**
- Running sore that does not heal easily; discharge of pus often continues for long periods; cavity in the flesh.—**Fistula, Page 163.**
- Saliva discharge from mouth; saliva is sometimes frothy; eating difficult; mouth inflamed; tongue sometimes swollen.—**Sore Mouth, Page 96.**
- Saliva runs from mouth; swallowing frequently attempted; neck arched; often makes peculiar noises.—**Choking, Page 80.**
- Shivering after stopping and giving a few convulsive movements of the head; in severe cases horse stops, throws head up, acts stupid, staggers, reels and may fall insensible only to get up in a few moments as though nothing had happened.—**Blind Staggers, Page 152.**
- Shoulder muscles wasting away; skin seems to grow fast to the bone; muscles on outside of shoulder blade seem to disappear.—**Sweeny, Page 179.**
- Skin over shoulder blade seems to grow fast to bone; muscles of shoulder waste away and seem to disappear.—**Sweeny, Page 179.**

Skin rough and scaly; severe itching; hair comes off in patches. Usually affects head and neck first.—**Mange, Page 170.**

Slimy, whitish discharge of an offensive nature; signs of general debility.—**Whites, Page 180.**

Slobbering when drinking; head held to one side; eating with difficulty; spitting out food; loss of flesh; swelling on face or under lower jaw; pus often discharged from swelling.—**Abnormal Teeth.**

Sluggishness; no appetite; pawing now and then; general uneasiness.—**Indigestion, Page 167.**

Soreness and small swelling just at the bottom and inside the hock-joint towards the front; lameness improving with exercise; holds foot forward, bending hock-joint when standing.—**Bone Spavin, Page 158.**

Sound.—Grating sound can be heard when part is moved; the broken bone may be felt; pain and swelling; bone broken and displaced; part cannot be used.—**Fractures, Page 166.**

Spot that is dark and usually contains pus found on hoof; pressure on spot causes pain; affected leg held loose when standing; lameness severe especially when on hard roads.—**Corns, Page 161.**

Spot that is tender found by pressure on sole of foot, frog or heel; lameness; removing shoe and finding no nail, prick or corn.—**Stone Bruise, Page 177.**

Sprains of ligaments and muscles.—**Sprains of Ligaments and Muscles, Page 176.**

Staggers; head thrown up; seems stupid; reels; may fall insensible and then get up as though nothing had happened; sometimes horse only stops, gives a few convulsive movements of his head and shivers.—**Blind Staggers, Page 152.**

Stiff and difficult movement; walks on heels; chill followed by fever; great pain; pulse full and hard.—**Founder, Page 164.**

Stopping of horse; head thrown up; seems stupid; staggers; reels; may fall insensible and then get up as though nothing had happened; sometimes horse only stops, gives a few convulsive movements of his head and shivers.—**Blind Staggers, Page 152.**

Stopping; panting violently; losing consciousness; falling; breathing slow; pulse weak; heart beats irregular.—**Sunstroke, Page 179.**

Stupid actions of horse; head thrown up; stops; staggers; reels; may fall insensible and then get up as though nothing had happened; sometimes horse only stops, gives a few convulsive movements of his head and shivers.—**Blind Staggers, Page 152.**

Swallowing attempted frequently; saliva runs from mouth; neck arched; often makes peculiar noise.—**Choking, Page 80.**

Swallowing difficult; when drinking some of the water runs out through the nose; throat usually swollen; some fever; coughing.—**Sore Throat, Page 175.**

Sweats profusely; muscles of body hard and stiff; jaw held shut; cannot eat; head elevated; nose protrudes; easily excited; "haw" drawn across corner of eye; horse usually stands.—**Lockjaw, Page 169.**

Swelling just below the knee and on the inside of the leg; an abscess may form.—**Bruised Knee.**

Swelling just below stifle joint; muscles appear cramped; drags stifled leg. **Stifled, Page 177.**

Swelling on face or under lower jaw; pus often discharged from swelling; slobbering when drinking; head held to one side; eating with difficulty; spitting out food; loss of flesh.—**Abnormal Teeth.**

Swelling on the elbow that is soft and flabby and contains a watery fluid. It increases in size and becomes hot and tender.—**Shoe Boil, Page 175.**

Swelling on top of head at first; later there is some pain and the swelling is full of pus; feverish condition of the parts.—**Poll Evil, Page 172.**

Swelling, small and sore just at the bottom and inside the hock-joint toward the front; lameness improving with exercise; holds foot forward bending hock-joint when standing.—**Bone Spavin, Page 158.**

Swelling that is puffy and feels as if it contained air; usually on the outside of the leg just above the fetlock-joint.—**Wind Puffs, Page 181.**

Swelling that is puffy on inside and outside of leg just in front of large tendons. By pressure the joint oil is forced from side to side.—**Thorough-pin, Page 180.**

Swelling that is puffy on the front of hock-joint.—**Bog Spavin, Page 158.**

Swelling that is small on inside of foreleg; sometimes lameness.—**Splint, Page 176.**

Swollen glands inside of the leg; leg enlarged; manipulation of leg causes pain; chills followed by fever.—**Big Leg, Page 153.**

Swollen in hollow of pastern; swelling red and tender; cracks and chaps extend in all directions and often bleed in cold weather.—**Scratches, Page 175.**

Swollen and inflamed joint following a wound on the leg in which there is a slippery fluid; horse becomes very lame; fever; loss of appetite; intense pain; as inflammation increases the fluid becomes darker and may contain pus.—**Open Joint, Page 170.**

Tears.—Profuse discharge of tears and mucus from eyes; eyes red and inflamed; lids swollen sometimes; strong light irritating.—**Sore Eyes, Page 96.**

Tender and hot swelling on the elbow; it is also soft and flabby and contains a watery fluid.—**Shoe Boil, Page 175.**

Tenderness and lameness of foot more noticeable when foot hits hard object; slight discharge of foul smelling pus from crack in horny frog; hoof dry, heel feverish.—**Thrush, Page 180.**

Tender spot found on sole of foot, frog or heel by pressure; more or less lameness; removing the shoe and finding no nail prick or corn.—**Stone Bruise, Page 177**

Trembling of muscles; hind quarters lame and stiff; profuse perspiration; difficulty in moving; urine dark in color; often hind parts go down before horse can be moved to stable; muscles swollen and rigid; animal makes unsuccessful efforts to get up.—**Azoturia, Page 152.**

Trembling violently; perspiring freely; breathing difficult; if forced to go staggers and seems unconscious until he falls; attack usually occurs when the horse is exercising soon after feeding.—**Stomach Stagers, Page 177.**

Urine.—Frequent and scanty passage of urine that is dark and thick; horse moves hind quarters with difficulty; often turns his nose toward his flank; high fever; colicky pains.—**Inflammation of the Kidneys, Page 167.**

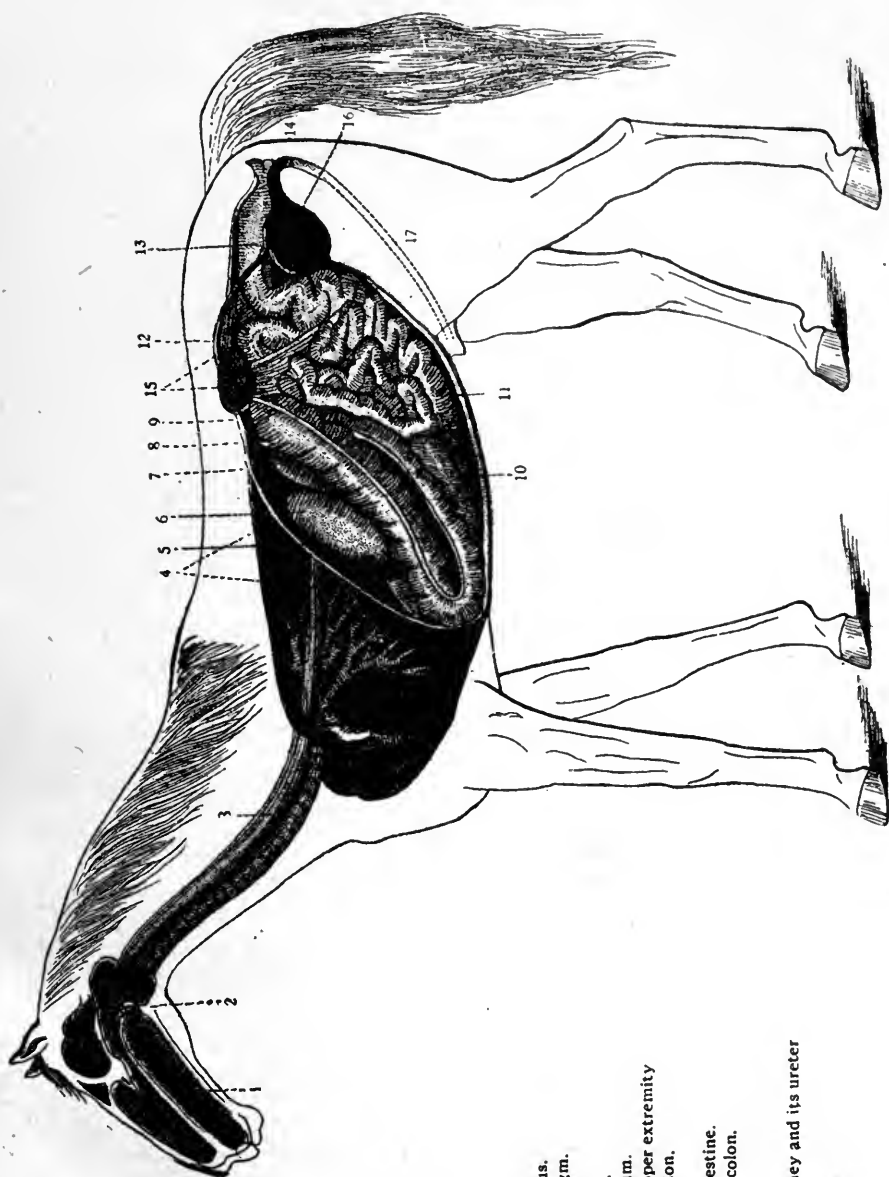
Water runs out through the nose when drinking; swallowing difficult; throat swollen; some fever; coughing.—**Sore Throat, Page 175.**

Whistling or roaring sound with each inspiration of air, especially when exercised.—**Roaring, Page 173.**

Whitish and slimy discharges of an offensive nature; signs of general debility.—**Whites, Page 180.**

Worms passed in manure; hair rough; appetite changeable; signs of ill health.—**Intestinal Worms, Page 167.**

Wound on leg in which there is a slippery fluid. Soon the joint becomes swollen and inflamed; horse becomes very lame; fever; loss of appetite; intense pain; as the inflammation becomes more severe the fluid becomes darker colored and may contain pus.—**Open Joint, Page 170.**



1. Mouth.
2. Pharynx.
3. Esophagus.
4. Diaphragm.
5. Spleen.
6. Stomach.
7. Duodenum.
8. Liver, upper extremity
9. Large colon.
10. Cecum.
11. Small intestine.
12. Floating colon.
13. Rectum.
14. Anus.
15. Left kidney and its ureter
16. Bladder.
17. Urethra.

DIGESTIVE APPARATUS.

TREATMENT FOR DISEASES OF HORSES.

Abortion.

This is the expulsion of the embryo colt. It is caused by inflammation of the bowels, kidneys, bladder or lungs. Blows from other animals, overwork, or falls are also causes.

Symptoms.—Coming in heat early, straining, neighing, swelling of the vulva, flanks falling in, pawing and kicking are indications of abortion.

Treatment.—Prevention is most practical. Prevent the above named causes. Feed properly, avoid constipation, bloating from frozen foods, etc.

Azoturia.

This is a disease of the liver and blood-forming functions. It is usually caused by overfeeding during the lighter working periods which do not give enough exercise to carry off the food. It attacks the horse shortly after being taken from the stable, or onto the road. It causes partial paralysis of the hind-quarters.

Symptoms.—In mild cases this affection sometimes appears as lameness in one limb. In severe cases the horse suddenly loses the spirit of starting out. Dullness, heavy flanks, dilated nostrils, pinched face and marked trembling are visible. Muscles of loins swell, horse moves stiffly, sweats profusely, drops behind and soon falls. When the horse falls it is usually hard for him to recover.

Treatment.—Here, also, prevention is best. Watch your stock. Regulate the feed. Let the animal get enjoyment from eating. Most animals as well as human beings will over-eat. Exercise regularly or turn out into the pasture every day.

In severe cases give 5 drams of aloes, followed by 4 drams of bromide of potassium which may be given again in 5 hours. This quiets the horse.

Hot fomentations such as blankets rung out of hot water placed on loins or small of the back eases the spinal cord, muscles, liver and kidneys and help the kidneys to act.

Barrenness.

This is a condition in mares which prevents conception. It often causes great loss where one can use the colts to good advantage. The condition should be eliminated if possible as it often injures both mare and stud, also decreases the number of mares that can be successfully served in a neighborhood. The causes are over acidity and abnormal conditions of the womb. Inversions, reversion and closed womb are causes which necessitate a veterinarian. In case of over acidity use the remedy given below.

Treatment.—Take one cake of bread yeast and dissolve in one pint of boiled lukewarm water. First flush the vagina with boiled water, then with clean, well oiled hands (rubbed with sweet or olive oil) and smooth finger-nails, insert

hand into womb gently dilating it with the fingers. About three to six hours before serving the mare, inject the yeast mixture. This is the most successful method used by breeders.

Big Head.

This is a disease of the bones in the head and causes them to become soft and porous. There is an enlarged, swollen condition of the head from which the disease gets its name. It affects all types of horses, mules, etc., and is found under all conditions. No cause is known, but the idea is, that it is a condition due to microbes.

Symptoms.—The beginning of the disease is not noticeable. Hock lameness, rheumatism, and straining of the back are indications. Loss of vitality, irregular appetite and stumbling often occur. Balls of food drop from mouth into manger when the bones become badly porous. The disease spreads to other parts of the body.

Treatment.—A veterinarian is the one to perform the lesions oftentimes necessary. The animal should be given a change of conditions; take to high altitude if possible.

At the beginning of the disease add lime to the drinking water. One peck of lime slaked in a keg of water is satisfactory and inexpensive.

Give a tablespoonful of powdered bone meal with each feed and give free access to plenty of rock salt, also give foods which are rich in mineral salts, such as: oats, beans, cottonseed meal, etc.

Big Leg.

This is shown by many different names, but the actual disease is a swollen inflamed condition of the leg usually affecting the two hind legs. Sluggish animals are susceptible also well fed animals in which case it is due to an excess of food elements in the blood.

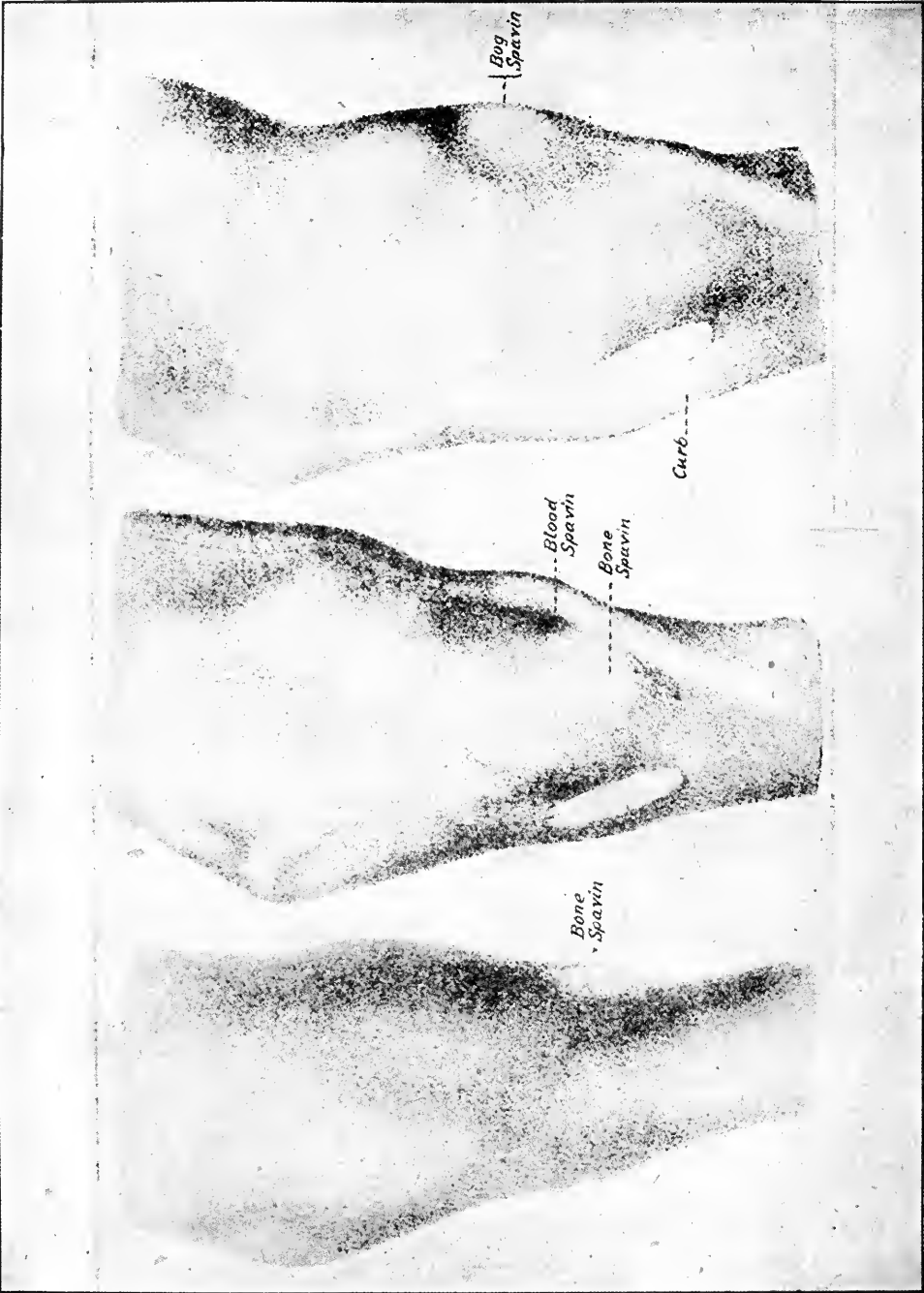
Symptoms.—Disease starts with a chill; there is high temperature, rapid hard pulse, quick breathing, uneasiness, bowels constipated, scanty urine, and the horse perspires freely. There is a swelling on the inside of thigh which surrounds the limb and extends down to the foot. Swelling grows larger and becomes permanent. Hair often comes off.

Treatment.—Bathe parts with hot water and follow with applications of cloths soaked in a solution of hot vinegar and water, equal parts, to which has been added 2 ounces of caustic potash per gallon. Dry thoroughly and bathe with camphorated soap liniment. Put the animal on light diet and give complete rest.

Blind Stagers.

This is known by a number of names. It is due to congestion of blood in the vessels of the brain, caused by excessive exertion, extreme heat, stimulants, or by an ill fitting collar stopping blood circulation. Short fat animals usually are the ones affected.

Symptoms.—The animal stops suddenly with eyes staring, with nostrils dilated and shakes the head, or stands quietly braced till he staggers and falls. Convulsive movements and death, as a rule, follow.





1. Sound Hock



2. Cured Spavin



3. Young Spavin



4. Old Spavin



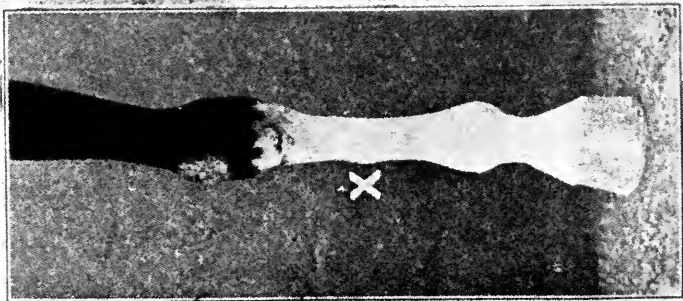
Capped Hock at X



Wind Puff at X



Bone Spavin at X



Splint at X



Bowed Tendon



COCKED ANKLE
Result of Corns and Similar
Diseases



Enlarged Fetlock Joint



Sidebone at X



Crooked Hind Legs With
Cocked Ankle at X

BLEMISHES THAT CAN BE PREVENTED EASIER THAN THEY
CAN BE CURED

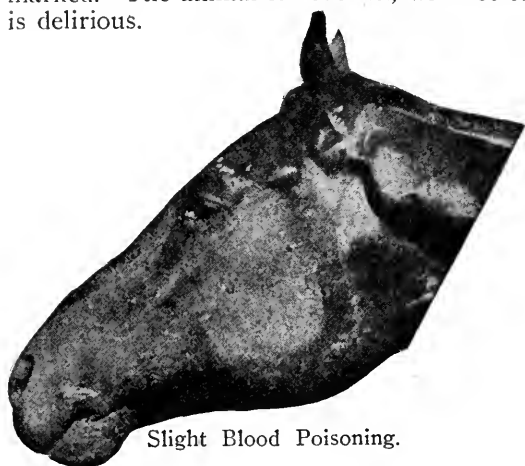
Treatment.—Remove above causes. A veterinarian should perform any operation necessary. Prevention is the easiest. Allow good movement, check the bowels carefully, give plenty of pure food and water.

Remove any obstruction of circulation such as a tight collar. If an operation, such as tapping the jugular vein or removing abscesses, is necessary, call a veterinarian. In case the horse becomes unconscious, bathe the head with cold water and rub the legs with strong mustard water.

Blood Poisoning.

This is due to the infection of a wound or cut. The poison from the affected part is taken up by the blood and carried through the system.

Symptoms.—If the case has progressed far the symptoms are very marked. The animal is feverish, will not eat, breathes rapidly, and oftentimes it is delirious.



Slight Blood Poisoning.



Bad Case of Internal Poisoning.

Treatment.—This trouble can mostly be prevented by the proper and immediate care of all wounds, no matter how slight. The wound should be washed out with some good antiseptic solution such as hydrogen peroxide. Clean it out thoroughly.

Kerosene is also good to pour on the part, or wash it with carbolic acid water, 1 part to 30 parts water. Bathe the part with hot water and if on the foot or lower part of the leg, rub the leg well toward the wound and away from the heart.

Bog Spavin.

This is a smooth, round tumor just in front and a little inside of the hock joint. Bog Spavin may cause lameness.

Treatment.—Rest is good. Strong liniments and blisters are satisfactory. Early, deep and well performed cauterization by a good veterinarian is the most successful.

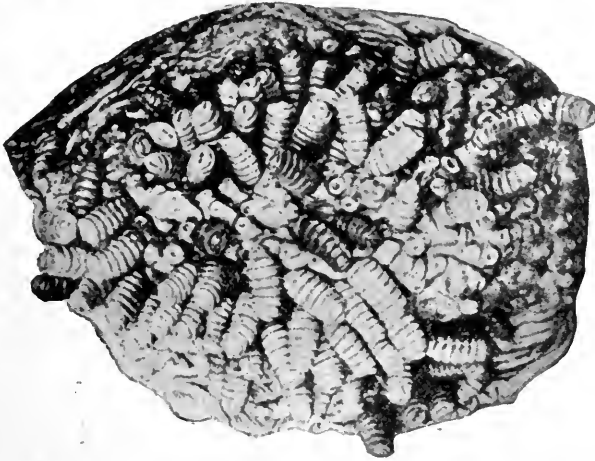
Bone Spavin.

This occurs on the hock joint and may be seen in various parts of it. This is a disease of the bone and tends to enlarge the joint, weakening it and

then causing lameness. Sprains and torn ligaments caused by galloping, jumping or hard driving on heavy roads are causes. Any injury to the hock joint may bring it on.

Symptoms.—There is a lameness which is very characteristic of spavin and which is more pronounced when the horse first starts out. After being driven some distance the lameness may disappear. The horse steps on the toe of the affected foot while traveling and mostly stands with the heel of the affected foot resting on the toe of the other foot.

Treatment.—The object is to weld together the diseased parts of the bone. To do this give absolute rest. Apply fomentations of hot water to reduce inflammation. Blisters may be applied with good results. Firing is often effective.



Bots in a Horse's Stomach and the Gadfly Which Causes Them.

Bots.

Caused by gadflies laying eggs on the hair of horses. The horse gets them into his mouth while biting himself and they are taken into the stomach, where they hatch out, attaching themselves to the lining of the stomach where they feed. They cause indigestion and severe inflammation of the stomach resulting in the loss of flesh. A horse badly affected with bots acts something like one with spasmodic colic. It often turns head to side, rolls on ground, rubbing sides. Rubs against stall or posts trying to relieve himself.

Treatment.—Rub him with a rag soaked in kerosene. Also scrape eggs off with a knife.

Feed horses raw potatoes in feed. This has been found effective by farmers in driving bots from horses. Give the animal one quart of molasses in two quarts of milk, and follow with a good cathartic.

Bronchitis.

This is an acute inflammation of the bronchial tubes. When exerted the animal breathes heavily. Often appetite is lost and he becomes debilitated. In other cases, there is a cough, discharge of whitish matter, and a rattle which can

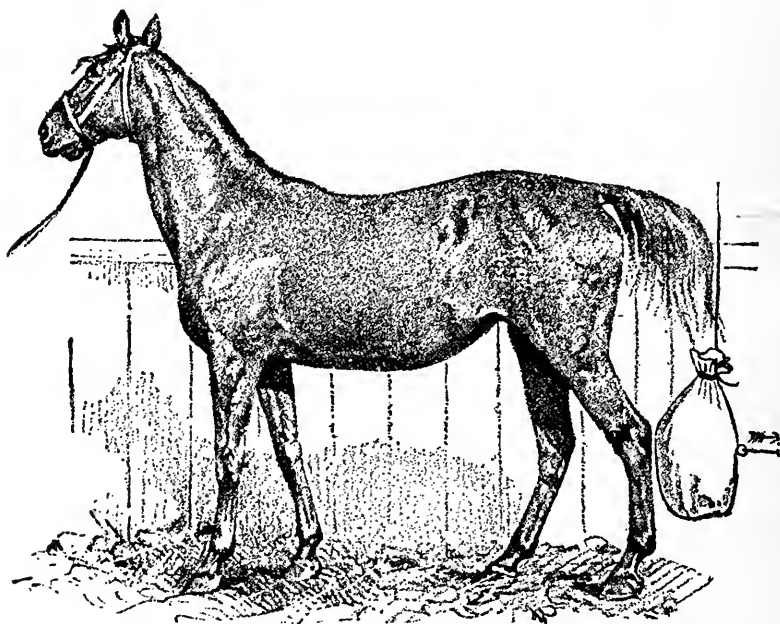
be heard when the ear is placed against the chest, behind the shoulder blade. The causes are the same as those of a cold and generally starts in the same way.

Treatment.—Rest is necessary. One ounce of Fowler's solution of arsenic water, three times daily, is good. Mustard application on the chest is effective. Linseed mashes, scalded oats, grass or green fodder is good for food.

Capped Hock.

This is a condition caused by horses hitting or rubbing their hocks against the walls or partitions of their stalls.

Symptoms.—A development of a bruise at the point of the hock. At first the swelling is spread, but later becomes like a callous. If pus collects the bones are liable to become diseased. It often causes lameness.



A Contrivance to Break a Horse of the Habit of Kicking in the Stall.

Treatment.—Sometimes a capped hock indicates a kicking horse. Hang a heavy bag, attached to a rope, directly behind the horse (see illustration). This will break him of kicking.

If there is inflammation, apply hot water. Most treatments are slow in producing results. Apply strong tea made from marshmallow leaves.

A severe blister at the start is good.

Catarrh.

This is an inflammation of the mucous membrane of the nose and throat. It is usually caused by cold or irritation of these membranes.

Symptoms.—Membrane is dry and congested. Then it becomes pink or red, a watery discharge follows, which later becomes thick and pus like. There are also chills followed by fever. The bowels are constipated.

Treatment.—Care should be taken to keep this disease from developing into something worse. Let the horse rest for a time. While feeding pour hot water on the hay. Give feed mash and linseed gruel. Steam the head by holding pail of hot water to which has been added a tablespoonful of carbolic acid, under the nose.

Give $\frac{1}{2}$ dram of reduced iron, three times a day, mixed with dampened feed. Sprinkle chloride of lime in stall.

Colic.

There are several different kinds of colic but the most common are wind and spasmodic colic. It is a painful crampy condition of the bowels caused by some irritant or by undigested food. Frozen foods cause development of gas and a crampy pressure results. The intestinal movements are much like the opening and closing of the hand.

Symptoms.—Restlessness, lying down, turning the head to the side, kicking the belly, sweats, shows severe pain; all indicate colic.

Treatment.—Baking soda, charcoal, or warm lard (1 quart), any one of which if given at once is good. Charcoal absorbs a thousand times its own weight in gas so a small quantity given immediately often saves much pain and trouble.

Essence of Jamaica ginger in 2 ounce doses, given in hot water, is effective.

Constipation.

This is a "bound up" condition of the bowels. When permitted to go too far, it causes colic which is often very hard to deal with. Colts are very often troubled with this disease. It is due to improper food and feeding.

Treatment.—Always keep horses in good condition by great care and feeding. Prevention is best. Oils are good to give internally. Injections may have to be given to soften feces. Use warm soapy water. Light sloppy diets are good. Green foods give relief. As young colts represent potential farm and money values, one must make every effort to save them.

Corns.

The forefeet are mostly subject to corns. These are formed on the sole in the angle between the bar and outside wall of the hoof. The color of the affected parts is often darkened by blood escaping from a ruptured blood vessel. The live horn is affected and dry, moist, pus gathering corns are formed. These are caused by contracted heels, long feet, bad shoeing, and excessive knee action in traveling.

Symptoms.—Lameness, restlessness, pawing the bedding behind him, feet advanced, pus or inflammation in affected part.

Treatment.—Always remove cause if possible. Correct the shoeing. Keep the hoof moist by bedding with damp tanbark. Use wet clay, flaxseed

meal, or a greasy hoof ointment to keep the hoof from becoming hard and dry. The horse may be made to stand with his feet in a box containing any of these.

Moist corns should be cut out. Inflammation should be poulticed and cold baths applied. If wound looks red, dress with oakum balls saturated in a weak solution of aloes or spirits of camphor.

If there is pus, open surface for its escape, then inject a weak solution of bichloride of mercury to cleanse the wound.

Curb.

This is a bunch on the back part of the hock, where in the normal state there should be a straight line. It is usually caused by a sprain of the tendon or one of its sheaths. Overbent, coarse, or thick hocks are especially subject to curb.

Symptoms.—There is usually a bunch spread over the affected surface, which sometimes develops permanent lameness. Later the bunch diminishes and becomes set. A curb makes the horse unsound.

Treatment.—Cold applications are best at the start. This stops the inflammation. Later, use pressure of bandages, to reduce the size. Blisters of cantharides and rubbing with iodine ointment are good. Strong applications of a mixture of salt, vinegar, turpentine and eggs are good. Take one ounce each of vinegar and turpentine, $\frac{1}{4}$ cup of salt, eggs to make a good running fluid. Apply with a rag.

Horse should have rest and a high heeled shoe on the foot of the affected leg.

Diarrhea.

This is due to irritation of the intestines and bowels; it is caused by eating bad food, by having poor teeth, low, damp pastures and stables. Colds and fast traveling are also causes. Long, rangy horses are subject to diarrhea. The horse suffers pain in the abdomen, has loss of appetite, passes liquid feces, and becomes thin and poor.

Treatment.—It is often simple, for good care and change of feed and water is probably all that is necessary.

Give a quart of raw linseed oil. Flour and water are good, also starch water. These should be given in a light paste form.

Distemper.

This is an infectious disease usually found in young animals. After its appearance, it usually leaves the animal in sound condition, however, it may develop a wind-broken horse. The abscesses most always break on the outside. It is passed directly from one horse to another or indirectly through the discharge being left on the fences, in drinking places or by contaminated air where the affected animals have been. Horses from 3 to 5 years old often get it in being shipped from one locality to another.

Symptoms.—During the coming of the last permanent teeth, the animal is most susceptible to this disease. Horse is sluggish, loses its appetite, its coat

becomes dry, legs become cold, eyes and mouth become rosy red, and a discharge is noticeable.

Treatment.—Moistened hay, warm baths and coverings, with proper diet are the most practical. Keep the animal from catching cold as complications set in at that time. Isolate the animal so the other stock may not be exposed.

During the fever one handful of Glauber's salts, three times a day, is good. Give a tablespoonful of baking soda several times a day. Steaming the head with tar is quite effective. Do not apply blisters or strong liniments to the throat. A serum can now be obtained from your veterinarian to combat the disease.

Dropsy.

This is known by the tissues being distended with a liquid and the skin when pressed, does not fill out but retains the impression. Good food and plenty of exercise is found to give the better results.

Enteritis.

This is an inflammation of the bowels.

The symptoms are much like those of colic. However, it may be distinguished from colic by the fact that the animal hesitates to lie down. It will often stand with all four feet close together. In colic relief is obtained in pressure on the abdomen, while in enteritis this causes much pain. If there is reason to believe that the disease is enteritis call a good veterinarian at once, as it is very fatal. The pain may be relieved by hypodermic injections. These must be given by the veterinarian.

Fistula and Poll-Evil.

This is a disease usually noted by tubes extending from the external wound to an internal deflection of cancerous or tumorous nature. The tubes discharge a pus to the outer surface. There may be fistulas in the shoulder, poll or head, and foot. The treatment can be very similar. The disease is caused by abscesses, wounds or bruises, blows from a whip or a club or butting the head or shoulder against a post or building.

Symptoms.—Soreness in front legs often follow an injury. Swollen lines appear on the withers which are painful to the touch. The swelling enlarges and the animal objects to being rubbed or touched at affected spot. When the tumor appears it is well to probe with a stiff doubled wire for the tube or the opening. This may be hard to find until the pus begins to run.

Treatment.—At first applications of cold water are good as a preventive. Later, when the tube is found, flush it clean with warm boiled water. Then tie a small lump of blue vitriol to a cord and gently push it to the bottom of the tube. Leave six inches of string hanging out. As soon as the tube projects a little from the flesh this shows it has been eaten off at the base.

Pull out the string and the tube, and wash out the cavity with hydrogen peroxide and keep the wound clean. Take good care that no infection enters

the wound. If there are several tubes, the same treatment applies, as it is the root from which the tubes start that one wishes to eat out with the blue vitriol.

Before pus forms apply oil of cedar.

Pour crude oil into the tube several times a week.



Fistula of long standing. There is considerable inflammation, with hair, skin, and underlying tissues destroyed.

Founder.

This disease affects the feet and usually the front feet. In unusual cases all four feet are affected. Founder does not affect any other part of the body. There are many causes for this disease; hot sand on feet, causing contraction of the hoofs; giving cold water while warm, or after heavy feeding of grain; or fast driving. Any injury to the feet is liable to bring it on.

Symptoms.—There are many symptoms, but the main one is loss of power to travel. The horse appears stiff and cramped because he does not want to use his feet. The horse stands with all four feet well under the body which is characteristic of the disease.

Diarrhea may start and fever appear, rapid perspiration, feet hot and dry and intense pain shown by pressing the hoofs.

Treatment.—Prevention here, as in all diseases where possible, is suggested. Proper care and common sense in the use of an animal gets the best results. Avoid the causes given in the above paragraph.

Fill a tub partly full of clay and stand the horse with the affected feet in it. Make the clay moist and cool. The feet should be placed in a tub partly full of warm clay or water. After an hour they may be changed to cold sand or water.

Along with the foot baths give large doses (four ounces) of saltpeter in a pint of water four times in 24 hours. If the horse lies down put a good poultice in a sack and tie to each foundered foot.



Galls.

Great care should be taken especially with tender horses to see that the harness, collar or saddle does not cause sores by friction. A gall is like a water blister at first, and when the skin breaks, the hair, dirt and sweat working into it will cause a bad sore. It is often called a "sit fast." When the callous forms it generally remains as a permanent bunch.

Treatment.—Proper adjustment of the harness and use of good pads will prevent these. Gradual work and good care in the spring will prepare the body for the harder work.

Cold water rubs, after the saddle or harness is taken off, will prove a fine preventive.

Two eggs in a pint of witch hazel is fine to rub on the gall. In well developed cases, the tumor can be cut off and treated with good results.

Fracture.

This is a break in a bone and is one of the most serious conditions to which an animal may become subject. There are many forms of fracture, and the displacements always call for the service of a good veterinarian. They are generally caused by external violence.

Symptoms.—The most positive symptom is the inability of the horse to use the part. Make a close examination; if a grating sound is heard, or a bunch appears on the injured part, a fracture has likely taken place.

Treatment.—Call a competent veterinarian to take care of the injury. The rapidity with which a fracture will heal depends on the age of the animal. Old animals with broken limbs had better be shot. Young valuable animals can be rigged up in a sling until the fracture heals. The animal must not be allowed to use the injured part.

Glanders or Farcy.

Glanders and Farcy are the same except that Glanders affects the head and Farcy other parts of the body, frequently the hind legs. This disease is very contagious and can be passed from animals to people. It usually results in death to the animal.

Cattle seem to be rather immune to the disease. The cause of Glanders is due to a specific virus of this disease being transmitted by direct contact. It is spread by watering troughs, stable men, hitching posts and anything on which has been any of the discharge from the nose of an affected horse.

Symptoms.—There is a sticky, colorless discharge from the nostrils. Also little ulcers appear on the membrane lining of the nostrils. In Farcy little bunches which are hot and sensitive to the touch appear under the skin. These are usually found on the hind legs.

Treatment.—Most states require the animal to be killed immediately and allow an indemnity. This is perhaps best, considering its highly contagious nature. Good feeding and tonics sometimes stop the progress but usually the horse will ultimately die because of the disease breaking out again. The cost of a veterinarian is slight compared with the damage an uncared case can do. All animals dying of this disease should be burned at once, and the stables thoroughly disinfected.

People who are around animals suffering with this disease must exercise the greatest care as it is extremely infectious and fatal.

Heaves.

This is really a continuous affection of the breathing muscles which leads to paralysis of them. It is usually found where improper food, such as dry clover, or damaged feed is given. Horses are affected much as people are with asthma. This is not a fatal disease. It could be avoided if young horses were driven correctly and not over driven at the beginning.

Symptoms.—There is a catchy moving in the flanks while breathing, also a grunting cough. Anyone can detect heaves although stramonium, if placed in the mouth, will allay it. The lungs lose their elasticity. Indigestion often accompanies heaves. Be careful in buying a horse that he is not "doped" with certain things which makes it hard to detect the ailment for several hours.

Treatment.—In old cases there is no cure. Wetting the hay and grain relieves it and enables the horse to work more efficiently.

A tablespoonful of baking soda given to the horse before a drive will enable it to travel well. A diet of chopped carrots, potatoes or turnips is good. Fowler's solution of arsenic, following directions, also gives relief. Give a teaspoonful of oil of tar in a pint of warm water.

Impure Blood.—(See Cattle Department, page 88).

Indigestion.

There are two kinds—acute or that coming quickly, and chronic, the form developed by continuous irritation. It is usually caused by improper feeding, so prevention is the easiest and most logical thing. Weak digestive organs, improper food, bad teeth, worms, working too soon after feeding, are all causes.

Symptoms.—Irregular appetite, refusing food at times and at other times being greedy, loss of flesh, passed grain, and colicky pains are signs.

Treatment.—Put teeth in good shape.

For worms give 1 tablespoonful of turpentine.

Equal parts of ginger, baking soda, and powdered gentian thoroughly mixed. Give one heaping tablespoonful morning and evening before feeding. Dissolve in $\frac{1}{2}$ pint of water and give as a drench.

Digestive Tonic.—One heaping tablespoonful of the following well mixed: Glauber's salt, 2 pounds; common salt, 1 pound; baking soda, $\frac{1}{2}$ pound.

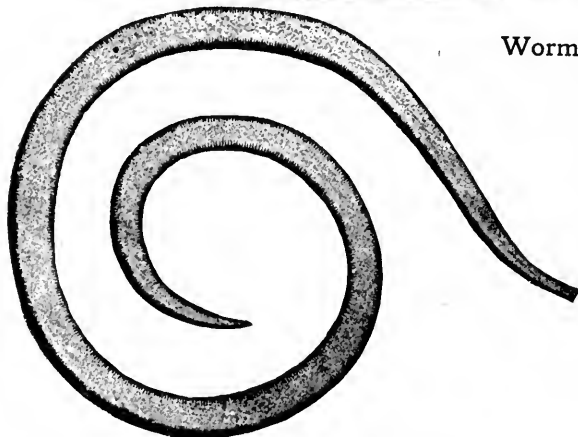
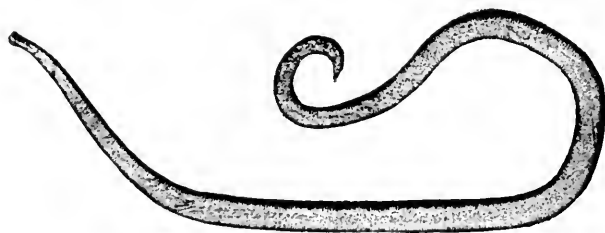
Inflammation of the Kidneys.—(See Cattle Department, page 89).

Insects and Snake Bites.—(See Cattle Department, page 90).

Intestinal Worms.

There are a number of different kinds of worms which infest the digestive tract of horses. They are usually more prevalent in the large bowel. They are known as: tapeworms, flukes, roundworms, pinworms, stomach worms and strongyles. They are often passed from the body in bunches.

Symptoms.—Colicky pains, poor appetite, constipation, or diarrhea are indications that a horse has worms. These symptoms with worms in the manure are proof the horse has worms.



Worms That Trouble
a Horse.

Intestinal or Round Worms.



Liver and Lung Worms.



Pin or Large Intestinal Worms.



Stomach Worms.

Treatment.—Turpentine is one of the best and simplest remedies. Give one ounce of turpentine and half a pint of linseed oil as a drench. An ounce of tobacco, once each day, for two weeks, is good. For pinworms inject a quart of warm salt water each day.

Knuckling.

This is a deformity of the fetlock joint. It is also known as cocked ankle. It is caused by a sprain of the tendon, or from weakness at birth.

Other diseases of the foot also bring it about. The hind legs are usually affected since they do the greater amount of work in carrying the body.

Symptoms.—Dislocation or knuckling forward of the bones in the ankle. The heels do not touch the ground in traveling and this develops clubfoot.

Treatment.—It cannot really be cured in its later stages. Line firing is often effective in treating the disease. Complete rest is needed. Proper shoeing should be given. A thick heeled shoe will help. If necessary an operation should be performed by a veterinarian.

Lockjaw.

This is a disease of the muscles in the face, neck and body. It usually causes spasms. From the fact that this serious and fatal disease is caused by a germ entering the system from the soil through simple nail pricks, deep cuts, and skin bruises, which heal on the surface, one can see the great care necessary. All cuts should be immediately washed with kerosene oil or hydrogen peroxide. Use a small syringe and probe to the bottom of the wound before releasing the liquid. If the wound can be kept open in pure air it is better as the germ thrives best where there is no oxygen. The poison is easily absorbed in the system.

Symptoms.—In acute attacks the animal will die in four or five days. There is difficulty in chewing and swallowing; the "haw" covers the inner part of the eye; jaws become locked and cannot be opened; noises make the animal go into spasms; the tail is elevated and immovable; the muscles are rigid. Lockjaw is different from spinal meningitis.

Treatment.—In a serious wound an injection of serum should be given. Have a veterinarian give it. The animal should be isolated so as to be kept quiet. Seven drams of Barbados aloes and two drams of solid extract of belladonna should be given at once. No treatment can be sure. Often the cost of treatment will be more than the animal is worth.

Loco Disease.

This is caused by animals eating the loco weed which grows in the great plain region. Their appetite for hay and grass diminishes, and, owing to the scarcity of nutriment in the plant they starve to death. Barium salts are found in the weed and tend to develop an unsound mind. The animal staggers about and finally loses power to travel.

The animal has fits and delirium. If taken at once, coaxing will often cause the animal to eat mash and well prepared foods. It should be immediately fattened and shipped out of the section.

Mange.

Small mites burrow under the skin, especially when dirty, and lay their eggs. These hatch, causing a sore on which a scab is found. The head, mane, tail, and back are affected. Rubbing produces a pleasant feeling to the horse as shown by a stretching of the head and upper lip.

Treatment.—Wash parts well with soap and water, then brush in a solution of $1\frac{1}{2}$ ounces of tobacco and 2 pints of boiled water. Every 15 days a new brood of mites appear, so continue the application. The harness and stables should be disinfected. A lime and sulphur dip is good.

Milk Fever.—(See Cattle Department, page 93).

Open Joints.

An external condition caused by blows, bruises, falls, kicks and other injuries. Carelessness in use of forks, boards, etc., result in cuts which cause the fluid to escape from the joint. A horse with a stiff leg is not of much value.

Treatment.—Warm fomentations or cold water applications should be applied at once. The joint fluid should be checked so it cannot escape. Immediate aid is essential and will save the animal lots of unnecessary pain and suffering. A sling in which to put the horse will be found to relieve the pain caused by standing on the limb.

Paralysis.

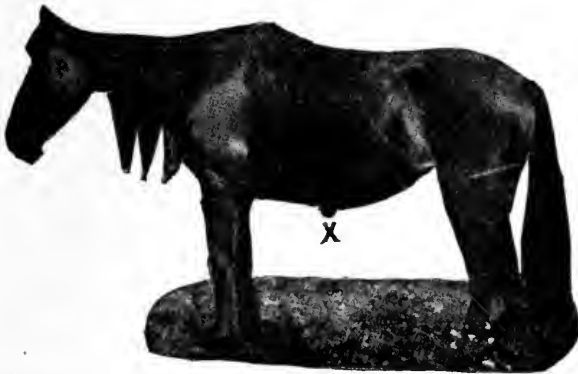
This is a condition where use of the muscular parts of the body are lost. It may affect part or all of the body. Most cases are caused by some injury to the brain or spinal cord. The causes are pressure or tumors on the brain, or disease of the blood vessels of the brain. General paralysis causes immediate death.

Symptoms.—Animal falls; is powerless to move, and unable to swallow; tongue hangs out; tail is curved; and limbs get cold.

Treatment.—Chloroform liniment may help relieve the local pain. The cause must always be removed. Fly blister or strong liniment should be applied. Internally give 1 dram powdered nux vomica or 2 grains of sulphate of strychnine. Some give a teaspoonful of Fowler's solution of arsenic twice a day in water. Light food, good air and clean stables should be had all the time.

Pink Eye or Influenza.

This is an inflammation which extends over the eye and because of its color named "Pink Eye." Blows from whips, twigs, clubs, or dust, sand, flies or any foreign substance cause this condition.



Influenza or Pinkeye. Note the Swelling at "X."



Influenza or Pinkeye. Notice swelling at "X." Also note the eye of this animal is normal.

Symptoms.—Watering of the eye, swollen lids, pink flush, fever, protruding "haw" and dilated pupil distinguish the disease. Pus may form and the lid becomes granular.

Treatment.—Remove any cause. Examine thoroughly. Take horse away from any cause of ammonia gas; keep off dusty roads. Wash eye with warm water mixed with white of egg. Salt solution is a good wash, also dissolve saltpeter in water (1 heaping teaspoonful) twice a day.

Pneumonia.—(See Cattle Department, page 95).

Poll Evil.

This disease is similar to fistula and is in fact fistula of the head. It is caused by hitting the head against a low beam or door. (For treatment see *Fistula*, Page 163).



Poll Evil.

Quarter-Crack.

A fissure in the front wall of the hoof of the hind leg is called a toe-crack. When in the front feet it is called a sand or quarter-crack. They are caused by dry wall of the hoof, or a change from damp to dry roads, floors, etc. Thick hoofs on small feet are subject to cracks. Heavy nails, improper nailing, cankers, quittor or corns with pus cause cracks.

Symptoms.—A fissure is usually the only sign. A discharge often comes from the crack, inflammation is present, also slight lameness.

Treatment.—Prevent enlargement of cracks. Keep the horn of hoof well oiled. Put clasps on fissures. Poulticing the hoof gets it back into good condition. Sometimes a leather "shoe" will keep the sand out.

Quittor.

This is a disease of a fistulous nature on the foot which causes pus to form and flesh to slough off. It occurs in both fore and hind feet. The heels and quarters are most liable but the coronet or top of the hoof is also attacked. Bruises in which infection develops from mud, foul water, etc., are the widest source of this ailment. Heavy horses with heavy hanging hair on the fetlocks and thick skins are most usually affected.

Symptoms.—Lameness usually precedes the development of a quittor. The opposite leg becomes swollen because of doing work. Thirst increases. A rubbery feeling tumor develops. Pus usually comes from tubes that form in the injury.

Treatment.—Mud and dirty water should be avoided. Wash off the foot with warm water. Cold water should be applied to stop the increase of inflammation. Use poultices of linseed meal or boiled turnips. Great care should be taken in dressing the wound and the poultice should be renewed every two days.

Put wet balls of oakum in a solution of eight drops of bichloride of mercury to 2 tablespoonfuls of water and add a few drops of muriatic acid to dissolve the mercury.

The tubes after cleaning with boiled water can be flushed out with tincture of iodine.

Rheumatism.

This is a disease similar to that of people resulting from practically the same causes and treated in the same way. Damp, cold stables are always likely to develop rheumatism in not only the animal, but also the attendants. It is usually felt in the joints and is a condition which can be considered as one in which the joint fluid is affected. Plenty of exercise, good food and treatment, applications of good liniments to the swollen parts are recommended.

Ringbone.

Often when a young horse is being trained, a slight bruise may be made near the coronet of the hoof, before the permanent hardening or development of the foot takes place. Much later, a ringlike or bulging surface can be seen. There are high, middle or low ringbones. Interfering while traveling causes many. Short, upright pastern joints are often affected.

Symptoms.—Lameness is the first symptom and there is some heat in the ankle. In traveling, the heel is placed on the ground first. If the ringbone interferes with the joints or tendons it may cause permanent lameness.

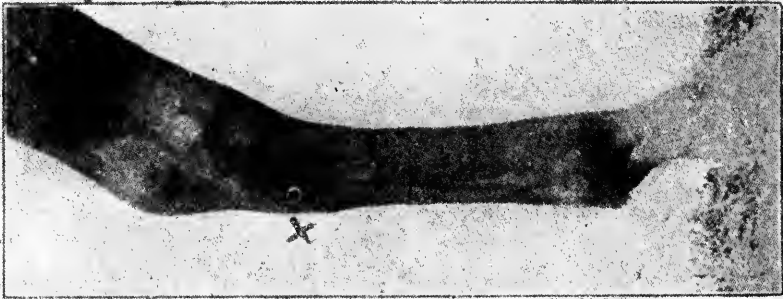
Treatment.—At the beginning, cold applications may stop the disease. Strong blisters may be applied. Firing is often successful. If in lower joints a cure is doubtful. Proper shoeing may help. No animal with ringbone should be bred as some consider the disease a hereditary one.

Roaring.

Usually the left side of the larynx is affected by some object obstructing the breathing apparatus of the horse. Well established cases cause the roaring noise when drawing air into the lungs. A paralysis of the muscles is caused by some derangement of the two nerves which supply energy to either side of the throat. Medical treatment is of no use in set cases. The insertion by a veterinarian of a whistling tube gives about the best results in the more serious cases.



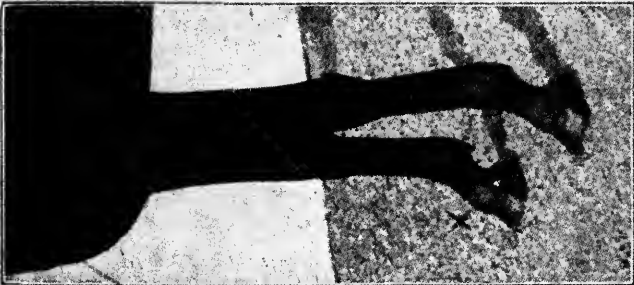
Thoroughpin at X



Curb at X



Bog Spavin at X



Ringbone at X

Scratches.

An inflammation of the glands of the skin in the regions of the heels. It is usually the result of improper feeding or overfeeding on grain, or irritation while traveling on slushy, muddy roads. Caustic soap washes, improper bandaging or severe exertion are frequent causes. There are scaly substances on the heels and cracks develop similar to chapping on hands.

Treatment.—Clean the part. Clip the hair close to the skin and apply a warm poultice of bread and milk; repeat in 12 hours. Then cleanse thoroughly and dust boric acid into the sores.

A good vaseline or ointment of 1 teaspoonful sugar of lead, carbolic acid, 10 drops, and lard is used by many farmers. Pine pitch smeared on parts proves successful. Cover with a cloth. Grease the parts twice a day when the horse is worked.

Screwworms—Or Maggots in Wounds.

The fly bites the horse and sucks the blood. It lays eggs in wounds, which develop into small maggots that burrow in and cause poisonous development. This may be stopped by applying kerosene oil to kill them. The kerosene is antiseptic and healing. It acts somewhat as though it seared the wound and causes it to heal from within toward the outer surface, in place of just on the surface leaving a wound that may later develop into a poisonous sore.

Tobacco juice is a good remedy to give.

Hickory wood ashes are used by some farmers.

Shoe Boil.

Kicking with the hind feet or chafing of the belly band of the harness causes a bunch to appear. It may appear on any part of the lower limbs. They have a core which distinguishes them from a common swelling. It is similar to both a tumor and an abscess.

Treatment.—These should be cut once across in both directions with a sterilized, sharp, clean knife. A good poultice will often soften the core which can then be pressed out. A mixture of salt and soap is a powerful application to soften and bring it to a head.



Shoe Boil or Capped Elbow

Sore Throat.

An inflammation of the throat is serious more from the point of the different diseases into which it may develop, than of the temporary disease itself. The chief causes are chills and exposure.

Symptoms.—A cough develops and there is difficulty in swallowing. Glands below the ears and between the jaws are swollen. Discharge comes from nostrils and breathing becomes hard.

Treatment.—Steaming the nostrils is advised. Put oil of turpentine in a bucket of hot water and have the animal inhale the fumes. Repeat this treatment frequently. The horse should be fed soft mashes and if possible, fresh grass. Good light liniments should be rubbed from ear to ear on the throat and a short distance from the windpipe. A mixture of kerosene and lard is good.

Spasmodic Colic.

The small intestines often become clogged with indigestible food. It is often caused by drinking cold water while the animal is warm; also from cold rains or drafts.

Symptoms.—Spasmodic colic starts suddenly. Horse stamps; looks around to side; cramps; shows acute pain; paws; rolls; gets up and down; sweats and only passes a small quantity of urine. Colic is usually quite plain to all horse owners.

Treatment.—Give the animal an injection of 6 quarts warm water which contains $\frac{3}{4}$ cup of glycerine. Chloral hydrate is good given one ounce in a pint of water as a drench. Baking soda, 1 tablespoonful in a pint of water absorbs the gas. About 30 drops of tincture of aconite relieves the pain. Walking helps horse to pass the gas. Force must be avoided. Tansy tea has never been known to fail for many farmers who use it. Jamaica ginger in 2 ounce doses gives good results.

Splints.

This is a bony enlargement on the cannon bone between the knee or hock and the fetlock joint. They are usually found on the inside of the forelegs. It is sometimes the cause of permanent lameness.

Symptoms.—Passing the hand over the limb will usually show presence of small bunch or splint. It is often caused by external hurts. Race horses often twist the leg and cause the small crack, which nature in healing and strengthening, covers with a bony bunch. There is lameness and limb is carried outward from below the knee. There is pain under pressure and usually swelling is shown.

Treatment.—Not much attention is needed in most cases and one is advised against continuously irritating the part. Surgical treatment is usually useless. Iodine applied to the part has given good results. White liniment is used also by many farmers. Eggs, vinegar, and turpentine mixed one ounce each with one or two eggs has been highly recommended.

Sprains.

Most ligaments and muscles are subject to external violence and falls, slips, etc., which often causes them to become torn. However, inflammation and loss of use are the usual indications of a sprain.

Treatment.—Local applications, warm fomentation, liniments and blisters are applied. Rest permits the torn section to heal.

Stifled.

The stifle or patella in a horse compares to the kneecap in man and is held in place by the muscular tendons passing over the thigh bone. It acts in keeping proper action between the joint bones. Often a horse slips, wrenching the ligaments and muscles holding the patella which slips out of place. Heavy pulling also dislocates it, especially in stumpy land.

Symptoms.—The horse in most cases drags the affected leg on its toe. There is stiffness at the thigh joint. Horse will not back up. When led forward it goes in jumps, dragging the injured leg.

Treatment.—If the dislocation is discovered immediately, a slap with the line or whip will cause the bone to slip back into place. This is not advised, however, as it might chip or injure the lining surface of the bone. Backing the horse up against a two foot bank will aid in the replacement. Often the patella can be worked into place with the finger. Placing the collar on the horse then tying a rope to the fetlock and running the rope up through the collar makes a pulley effect which is used by many farmers in treating a stifled horse. The affected leg is strapped forward until it heals. After the bone is snapped back into place a paste of salt and eggs applied to the joint will contract the muscles and heal the ligaments in a very short time.

Stone Bruise.

In traveling, many horses step on sharp stones or get a stone wedged between the shoe and frog. The pressure is severe and causes lameness. The animal may hobble on three legs. Pus forms and poisoning is liable to develop.

Treatment.—Stone should be removed immediately. Shoe should be taken off and the foot placed in cold water, to prevent inflammation. The wound should be well cleaned and poulticed with oakum balls, turpentine, or kerosene oil. A blacksmith can pad the foot with oakum and a leather-soled shoe.

Stomach Staggers.

In this disease which results from improper digestion the circulatory system of the horse may be affected. The large colon or stomach becomes packed with unpassed feces. It gradually hardens until death comes. Dry hay or stalks often develop impaction.

Symptoms.—Slight pains come on. The animal keeps its head low. It paws and walks around slowly. Lies down fully stretched out on its side for from fifteen to twenty minutes. Tapping the sides brings solid, deadened sound. The horse often trembles violently.

Treatment.—Immediate movement should be induced. A long hose should be soaped or well oiled and run into the rectum, then warm soapy water should be gently injected. As this is a serious situation good care must be used. A large cathartic of 1 ounce of powder barbardos; 2 drams calomel and 1 dram powdered nux vomica; or 1 pint linseed oil and 15 drops of croton oil,

are good. After a movement is induced a quart of castor oil will have a healing affect on the bowels which will be extremely sore. Twenty-four hours are usually required for the cathartic to work. Give plenty of water to drink. Rubbing the sides of the horse gently with a soft rag may aid in breaking up the packed material in the bowels and aid the horse in obtaining a passage. Ginger and red pepper are good.



Stringhalt,

Stringhalt.

So many conflicting theories are broadcast about this ailment that an attempt to explain it in detail is useless. It is usually recognized because of the jerking up of the leg. It affects both hind legs but usually only one at a time. Sometimes the downward movement is as hard as the upward. A competent veterinarian will be the judge of what to do. There is no need for a man to attempt the impractical things that may be done. Only those treatments that give known and definite results are the ones for an unskilled man to use on his stock.

Sunstroke.

During the hot summer months all horses that work continuously in dry open fields are subject to sunstroke. Heavy horses are the most liable to be affected by the heat. Improper care in watering and feeding induce improper respiration.

Symptoms.—Just before the critical period the driver will notice that he has to urge the animal more than usual to get it to work. Right then is the time to stop in a cool place and rest the animal. If the animal is not stopped in time the perspiration ceases, there is hard breathing, blowing nostrils, staggering, and a fall results. When the animal is down it is much harder to aid in recovering.

Treatment.—As stated above, prevention when first symptoms appear obtains the best and surest results. Take the horse to a cool place. Pour cool water on its head and take off the harness. Do not work the animal for several days. A horse that is once affected will always be susceptible to heat, so a few days rest at the right time is well given. Do not bleed. Rubbing the limbs is good. A half ounce of carbonate of ammonia given in a pint of water will be found beneficial.



Swamp Fever.—Notice how animal has fallen away. Little blood is in the system.

Swamp Fever.

In parts of Manitoba, Minnesota, Montana, North Dakota, Virginia, Texas and New York, the horses are often badly affected with this disease. It is known by many names and is easily distinguished in these localities because of the sudden onset fever, continuous emaciation, great appetite and staggering gait. The mortality is so great that no satisfactory treatment has yet been found. Stimulating the bowels aids the horse and gives much relief. Cold water sponge baths are good. The sick animals should be kept apart and all places where the sick have been should be disinfected with a solution of six ounces of carbolic acid, chloride of lime or compound solution of cresol to a gallon of water. A potato sprayer is good to use in disinfecting.

Sweeny.

This is often due to lameness or injuries below the elbow and not always to shoulder diseases. There are numerous causes because of the hard work carried by the shoulders. Slips, sprains, and soreness are among the causes.

Symptoms.—These are peculiar to this disease alone. The lameness is continuous. Shoulder movement is practically stopped. At rest the leg is carried forward. Upon stepping forward the leg is carried in a peculiar manner. The shoulder muscles become contracted and withers away.

Treatment.—Rest will tend to give the most relief. Cool applications give results. Good liniments and massaging will start constructive action. Pay close attention that the ailment does not get worse. Feed oats and good hay. Give the animal exercise if it is not lame.

Thoroughpin.

This is found at the back and on the top of the hock in the part immediately behind the shank bone. It is round and smooth. The swelling is usually on both sides and a little in front of the hamstring.

Treatment.—Blister when found. Soap and salt is good. The famous farmers' liniment of vinegar, turpentine, and eggs, has proven successful. If you wish to get a "white" liniment add ammonia, which will prove beneficial.

Thrush.

Draft horses often get a bad wound in the cleft of the frog which develops pus. All horses are liable to the disease. Filthy stables and bad, muddy roads cause it.

Symptoms.—Increased moisture in frog and a bad smell. Discharge takes place. There is lameness only in bad cases.

Treatment.—Cleanse thoroughly and remove causes. Pare away the diseased parts. A blacksmith's knife is all right to use, but be careful not to cut too deep. Apply a good poultice of boiled turnips mixed with a handful of powdered charcoal. Some cases are not curable. Proper shoeing will help to relieve the animal.

Warts.

Warts or tumors grow many places on the animal's body. Small ones can be cut off with shears and the larger ones with a sharp knife. On broad-surfaced warts a hot iron applied will give good results. Acetic acid applied with the end of a match to the wart will gradually eat it to the surface of the skin. Care should be taken to keep from burning the live skin, and hands in applying.

Whites.

This is a common disease known also as leucorrhea which consists of a whitish discharge from the womb. It is due to subacute inflammation of the mucous membrane of the womb and is caused by laceration.

Treatment.—Flushing of the womb with warm boiled water should be done first. This should be followed three times a day with an injection of 2 teaspoonfuls of carbolic acid; $\frac{1}{2}$ dram of tannic acid in one quart of boiled water. Three drams of iron sulphate may be given internally.

Wind Puffs.

Small sized puffs appear usually on the forelegs in the upper part of the fetlock joint between the tendon and shin bone. Colts are often affected. Horses with small joints and too much knee action are most susceptible.

Symptoms.—When standing on the foot the tumor bunch is hard, but when foot is lifted the bunch is soft. Joint is bent while standing. The animal is often lame.

Treatment.—Resting the young horses tends to drive it away. High-heeled shoes give satisfaction, also cold water applications. Blisters are used by many. Elastic bandages help hold the joints stiff. Iodine often helps to drive them away.

Wounds.

In most cases local treatment must be given. Keep the wound clean from flies and infection. Kerosene oil is always handy and should be used. This will heal wound from the inside. Flour will stop bleeding. Cold water will also often stop bleeding. Bandage the inside of a dried puff-ball on the wound to stop bleeding.

SHEEP PRODUCTION.

Their Adaptability.—Sheep are adapted and fit nicely into the conditions and systems of agriculture in many sections of the country. On most farms, at least a small flock of sheep would be profitable, if the farm organization and the help to care for them insures proper management. Sheep are valuable for their wool and mutton and for the utilization of lands that ordinarily grow up to brush and weeds or that are not adapted to other classes of stock and other purposes because of their hilly, broken condition. The success of sheep on ranches of the West and on small farms is evidence of their wide range of adaptability.

Necessary Requirements.—While sheep are capable of utilizing many weeds and can live on scanty lands more or less covered with brush, it is a mistake to expect or to think that they will thrive to the extent of being profitable if maintained under such conditions altogether. Thousands of sheep die every year from want of proper feed and shelter and because of improper management. An abundance of feed throughout the year must be provided if one is to expect the best results. Sheep are the most delicate of all classes of farm animals and require the attention of a conscientious and faithful attendant who understands the importance of regularity, gentle and patient treatment, protection from excitement caused by dogs, wild animals and even strangers, and who knows at all times when the flock is thriving properly. Sheep will not do well and cannot be maintained on low, wet ground. Rolling, hilly land is well adapted to sheep raising. Land that grows sweet, luxuriant grasses and that is pastured to the extent that the sheep get short, fresh bites, is ideal.

Sheep can endure cold weather and do not require protection from the cold during the winter unless the ewe flock should be bred to lamb in late winter or early spring when it will be absolutely necessary to have a warm place for ewes and lambs during the lambing season and until the lambs are well started. Sheep must be kept dry and sheds should be constructed in a manner to keep out storms and to prevent the sheep from being subject to winds and cold drafts. Plenty of pure, fresh air is necessary. Cold rains in the spring and fall often do great damage to flocks that have been turned out. Sheep are of a dainty disposition and subject to indigestion and infection by parasites where conditions are not absolutely clean. Pure, fresh water, clean feed boxes, wholesome feeds, pastures that are free from filthy pools and that are rotated to prevent infection from sheep parasites, should be provided and are important requirements for success in the sheep industry.

Types and Breeds of Sheep.—There is a greater variety of distinct types among sheep than any other class of farm animals. In considering sheep from the standpoint of wool production one has a choice of medium or middle wool, long or coarse wool, and short or fine wool types. Breeds

representing these types will be noted in the tabulation of breeds and their principal characteristics. The variation in the form and thickness of flesh of sheep, produces a range in the size and weight from very spare wool types to very thick and heavy mutton types. The medium or middle wool and the long or coarse wool breeds are naturally of the mutton type. The smaller, fine wool breeds do not excel in mutton production. The larger, fine wool breeds, more especially the Rambouillet, have been improved in mutton form and compare more favorably with other mutton breeds.



Every animal sold off the farm carries pounds of fertility that must be replaced in some form.

Choosing a Breed.—One's preference can be indulged in the selection of sheep. The character of the land affects its adaptability for sheep of a given size. Smaller breeds will be most satisfactory on hilly lands, while the larger breeds are better adapted and require comparatively level land. Breeds that excel in mutton production are under ordinary conditions regarded with most general favor. Hot house lambs for Christmas and winter market demand breeds that will mate in summer. The Dorset Horn and Tunis are the two most profitable breeds for this purpose.

Selection of Ewe Flock.—The late summer or early autumn season is when the flock owner culls his flock and prepares the breeding flock that he expects to winter. There is usually a surplus of ewes suitable for breeding and this offers the beginner, or one desiring to increase his flock, the best opportunity to buy. The owner as well as the buyer of breeding ewes should avoid non-breeding, broken mouthed and diseased ewes. Ewes with injured

TYPES AND BREEDS OF SHEEP.

Type	Breed	Nativity	Weight	Weight of Fleece	Distinguishing Characteristics
Fine Woolled	American Merino	Spain	140-175 90-125	15-20 12-15	Nose short, wrinkly, white. Ears white. Skin wrinkled. Rams have heavy spiral-shaped horns, and heavy folds about neck and shoulders. Wool fine, short and dense.
	Delaine Merino	Ohio, Pennsylvania	140-190 100-150	12-18 9-15	An offshoot of American Merino. Considerably larger and smoother. Wool longer. Rams usually have horns, though one strain is without.
	Rambouillet	France	150-225 125-175	14-18 10-14	Considerably larger and more rangy than Delaine Merino. Except in size and having fewer wrinkles very similar to American Merino. Popular for crossing with range sheep because of size and hardiness.
Medium Woolled, Mutton	Southdown	England Southdown Hills	150-175 125-140	5-7	Face mouse colored. Body very compact. Excellent for mutton and for crossing to improve mutton type. Smallest of down breeds. Hornless.
	Shropshire	England, Counties Shropshire and Stafford	200-225 150-160	12-15 9-10	Face dark brown well covered with wool. A very popular breed, widely distributed because of its general purpose wool and mutton type. Hornless.
	Hampshire	England, County of Hampshire	225-250 175-200	7-10	Face very dark brown or black. Ears long and dark. Somewhat larger and more rangy than Shropshires. Hornless.
Medium Woolled, Mutton	Oxford	England, County of Oxford	250-350 180-275	6-10 5-7	Face light brown. Breed resembles Shropshire slightly but is larger and more massive in frame and features. Wool is longer and more open in fleece. Largest of down breeds. Hornless.
	Suffolk	England, County of Suffolk	200-240 175-200	7-9	Face and head bare of wool, glossy black; wool on face not objectionable. Ears long. Resembles Hampshire except for bareness of head. Hornless.
	Cheviot	England and Scotland, Cheviot Hills	200-225 150-160	8-10	Face and head bare to behind ear, white in color. Very attractive. Very hardy and adapted to hilly lands. Usually hornless.

TYPES AND BREEDS OF SHEEP (Continued).

Type	Breed	Nativity	Weight	Weight of Fleece	Distinguishing Characteristics
Medium Woolled, Mutton	Dorset Horn	England, Central and Southern Part	215-225 150-165	6-8	Face white. Both rams and ewes have horns. Head carries short foretop of wool. Body somewhat rangy. Popular as an early lamb producer.
	Tunis	Africa	150-175 120-150	6-8	Face yellow brown or mottled. Ears large and pendulous. Usually hornless. Similar to Dorset Horn in wool and ability to produce winter lambs.
Long Woolled, Mutton	Leicester	England, County of Leicester	225-250 175-200	9-11	Face and head white, usually bare of wool. Hornless. Smallest of long woolled breeds. Fleece long, coarse and lies in fine, spiral locks.
	Cotswold	England, Cotswold Hills	250-275 200-225	11-14	Fancy white, gray or spotted. Nose more or less Roman. Fleece lies in long, coarse rather large pencil-like locks. Hornless.
	Lincoln	England, County of Lincoln	275-300 225-250	12-14	Face resembles Cotswold in color. Good specimens have short foretop of wool. Largest and produces the longest wool of all breeds.

udders and that are poor milkers are unprofitable for raising lambs and should go to the butcher. The condition of the ewe in late summer usually indicates whether she has raised a lamb successfully and as a rule the thinnest ewes at this season are the best breeders. Never select ewe lambs with the object of breeding them the first fall.

The Mating Season.—The gestation period of the ewe is on the average 147 days and on this basis and the time it will be most desirable to have ewes produce their lambs, one should determine when the ram should be turned with the ewes. March and April are desirable months to have lambs born if warm lambing quarters and all conditions are suitable for handling the flock. Early lambs have the advantage of getting more personal attention during the first week of their lives, making an earlier growth, and enabling the farmer to put them onto the market before the bulk of lambs are ready and shipped.

The care of ewes after lambs are weaned, has much to do with successfully mating them. Lambs should be carefully weaned so as to leave the ewe's udder in normal condition. To insure best results the ewes should be put in scanty pastures and partly milked by hand the day following, and again at intervals of two, three and five days respectfully, when usually there

is no further necessity of milking them and the udders are in perfect condition for the next lambing season. Many ewes fail to raise a lamb because their udders become caked and ruined as a result of weaning the lambs without giving attention to them.



A Shropshire Field Ram.
By Courtesy of Arthur Broughton & Sons, Albany, Wis.

As soon as the ewe flock has been properly dried off and culled, it should be given an opportunity to improve in condition by having access to good pasture supplemented if necessary with special forage crop. Rape of the Dwarf-Essex variety is a good crop to supply extra forage. Pastures may

be supplemented by feeding oats with cabbage, but these feeds are more expensive.

The system of improving the condition of the ewe and getting her into strong, vigorous condition is called "flushing," and has the following advantages:

The lambs produced are usually stronger and more vigorous.

Ewes are more apt to produce twins and triplets and thus increase the percentage of increase.

Ewes breed safely within a shorter period of time which accordingly reduces the time that it will be necessary to watch and give special attention to ewes during the lambing season.

Feeding the Ewe Flock.—The ewe flock that is in good condition at mating season can be wintered at a very reasonable cost and on comparatively little grain. A good grade legume hay and roots up to within a few weeks of lambing time, may be all that is necessary. Clover cut in full bloom or alfalfa and other leguminous hays are best. Oat and pea hay, blue grass, bright fodder and a fine grade of oat straw may be utilized. Coarse hays like timothy and marsh grass and fodders and hays that are moldy and musty should never be fed.

For a few weeks prior to lambing time and oftentimes throughout the winter when the roughage is not of the best quality, a mixture of three parts oats and two parts wheat bran, fed at the rate of one-half pound per day, insures good condition and milk flow on the part of the ewes.

Chopped roots are excellent for ewes where they can be grown at a reasonable cost. Good corn silage, free from mold and not too acid, can be fed as a suitable substitute for roots to a good advantage. Ewes accustomed to succulent feed can be safely fed two pounds of roots or silage per head daily.

After lambing there is danger of milk fever on the part of the ewe during the first three days and grain should be reduced to a very small amount if fed at all. After this danger is over, grain feeding should be resumed and the ration increased to the extent that the ewes thrive well and produce ample milk for their lambs. Seldom is it wise to feed more than two pounds of grain. Keep salt where sheep have free access to it.

Additional Suggestions on Care of Ewe Flock.—Keep the flock exercising every day that the weather permits.

Do not allow ewes to become wet from storms and avoid draughts of cold wind sweeping into their pens.

Be present to give any assistance necessary at lambing time.

Treat cases of caked udder by bathing with hot water, drying and applying melted lard or mercurial ointment, repeating this three times a day until relief comes.

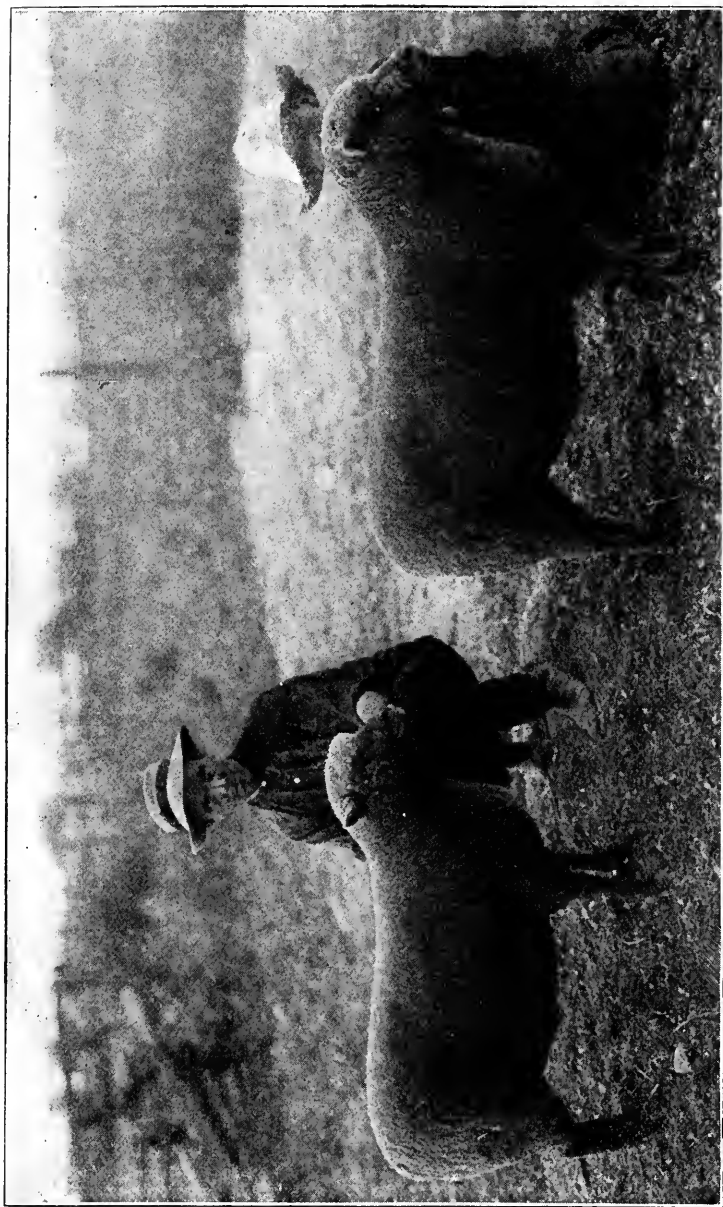
Treat sore teats by applying vaseline frequently. File the teeth of the lamb having the sharp teeth that causes the difficulty.

Tag ewes to the extent that the wool about the udder does not interfere with the lamb.

SCORE CARD FOR MUTTON SHEEP.

SCALE OF POINTS	Pos- sible score	Points deficient	
		Student's score	Cor- rected
Age..... Teeth.....			
GENERAL APPEARANCE—24 POINTS			
Weight.....estimated.....actual pounds			
according to age.....	6		
Form, low, long, symmetrical, compact, and evenly covered			
with firm flesh.....	10		
Quality, clean bone; silky hair.....	6		
Temperament.....	2		
HEAD AND NECK—9 POINTS			
Muzzle, fair, size; nostrils large; lips thin; mouth large.....	2		
Eyes, full, bright.....	1		
Face, short, bold expression.....	1		
Forehead, broad.....	1		
Ears, fine, erect.....	1		
Neck, thick, short; throat clean.....	3		
FOREQUARTERS—13 POINTS			
Shoulder Vein, full.....	2		
Shoulders, covered, compact.....	3		
Chest, deep, wide, large girth.....	3		
Brisket, full, prominent; breast wide.....	2		
Legs, straight, short, wide apart, strong; forearm full, shank			
smooth.....	3		
BODY—13 POINTS			
Back, straight, wide.....	4		
Loin, broad, thick.....	4		
Ribs, deep, arched.....	3		
Flank, low, thick, making underline straight.....	2		
HINDQUARTERS—17 POINTS			
Hips, smooth, far apart.....	3		
Rump, long, level, wide.....	4		
Thighs, full, well fleshed.....	3		
Twist, plump, deep.....	4		
Legs, straight, short, strong; shank smooth.....	3		
CONSTITUTION—10 POINTS			
Girth, large.....	3		
Skin, pink color.....	3		
Fleece, dense and even over body, yolk abundant.....	4		
WOOL—14 POINTS			
Quantity, long, dense, even.....	6		
Quality, fine, soft, pure, even.....	4		
Condition, bright, strong, clean.....	4		
Total.....	100		

(Score card used at Wisconsin College of Agriculture.)



Typical Southdown Ewes.
By Courtesy of Geo. McKerrow & Sons, Pewaukee, Wis.

Shearing the Flock.—The season for shearing may be regarded as the flock owner's harvest time. Usually this time is about April 1st or somewhat later. The condition of the weather and opportunities to house and protect sheep that have been shorn, from cold, determines how early one can commence the work of shearing. Shearing is sometimes delayed in order to increase the weight of the fleece by the additional amount of yolk or oil that accumulates faster in warm weather than it does in winter. Everything considered, this practice does not increase the profits in sheep practice and the best flock owner's aim is to shear as soon as the weather becomes warm to the extent that sheep begin to show signs of being uncomfortable, and one is sure that the weather is not going to be changeable and unsuitable for sheep that have been shorn. Delaying the time of shearing not only incurs discomfort on the part of sheep, but results in more or less loss of wool that is shed about the legs and underside of the body or that becomes soiled to the extent that it is unmarketable.

The earliest, quickest and best job of shearing can be done with a shearing machine which is now mostly used. Hand or power machines may be secured and for flocks of considerable size or in neighborhoods where there is considerable shearing to be done it will undoubtedly pay to have a power machine.

The following precautions are worthy of mention in shearing:

Handle the sheep as quietly and gently as possible. Struggling is especially bad for pregnant ewes and ewes nursing lambs.

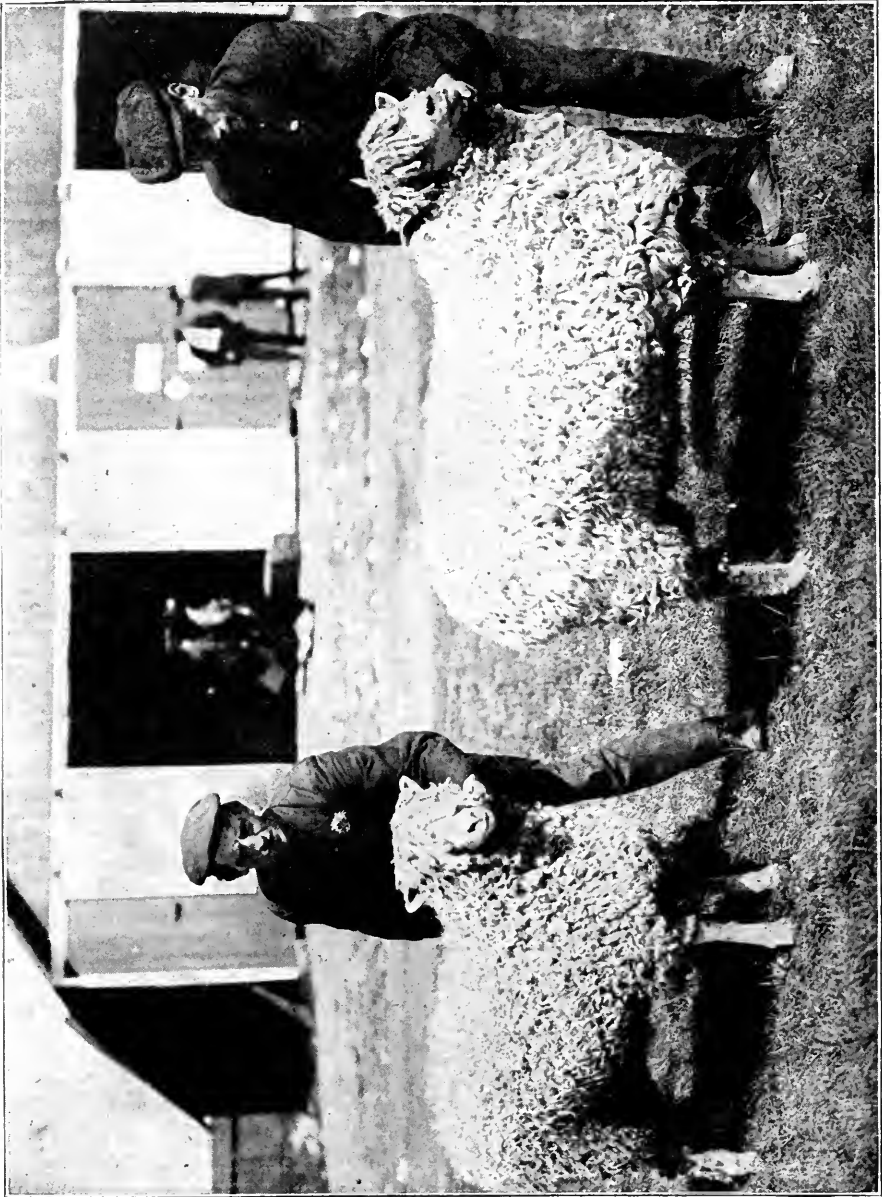
Keep shears or knives sharp and run them as closely to the body as possible. More wool and a better clip for manufacturing purposes is thus secured.

Avoid cutting the sheep's skin by keeping the skin stretched by the free hand and holding the cutter flat to the body.

Particular pains should be taken not to cut off the end of the teats of ewes or the end of the vagina. This precaution is important to insure ewes nursing their lambs and to insure their breeding successfully.

Method of Shearing.—Where the machine is used it is considered the best plan to shear on a clean floor. The sheep can be kept in a better balanced position and turned to the several positions that enables the shearing to be most quickly and easily done. Shearing the belly and inner side of the thighs, then the lower side of the neck, the left side of the head and finishing with the right side, is one of the common methods of shearing with the machine. One should develop a system that comes most natural to him and that at the same time accomplishes the work in the quickest time and with as little shifting of the sheep as possible.

Tying the Fleece.—The fleece should be kept intact and not torn apart any more than is necessary in taking it off the sheep and tying it. Buyers prefer to have wool rolled and tied neatly although wool tying boxes are used in many instances. Only twine that is especially prepared for tying wool should be used for the reason that the use of other twine reduces the value of the wool for manufacturing purposes and buyers must take this into



Typical Cotswolds.
By Courtesy of F. W. Harding, Waukesha, Wis.

consideration in buying a clip of wool. Wet and filthy portions of the fleece and all foreign substances must be separated and kept out of the fleece. Buyers can readily judge the character and value of wool and appreciate an attractive clip to the extent that they will pay the top market price for it. Keeping sheep away from straw stacks and protecting them from chaff and burrs of all kinds add much to the value of the clip of wool.

Rams for the Breeding Flock.—A vigorous, pure bred ram of desirable type should be selected early in the season to insure no delay in the mating season. He should not be over fat, but in good condition. For a month prior to and during the mating season, he should be grained in addition to being fed the best of hay and grass pasture. One-half to one pound of grain daily, like oats, bran and peas with perhaps a little oil meal, should keep him in good condition. Mangels, sugar beets and silage should not be fed.

The ram to be used for service should be a year and a half old at least. It is very undesirable to use a ram lamb and if necessity demands his use, he should not serve more than 8 to 12 ewes, during the season. An older ram can be expected to breed fifty to fifty-five ewes successfully during the mating season. Where the rams run with the flock, it is well to let them run only for the night or for a few hours in the morning. Painting the breast of the ram enables the owner to know what ewes are bred and in pure bred flocks it is well to know the dates that each ewe is bred in order to anticipate the date that she will lamb. Where two or more rams are employed to serve a flock of more than fifty-five ewes, each ram should be given a flock. After there has been an opportunity for all the ewes to have been bred, rotating the rams will overcome failure on the part of any one ram and insure most of the ewes being successfully bred.

Never hesitate to get the best rams possible.

Hand coupling is not always practicable, but it conserves the strength of rams and is practiced by many of the best shepherds.

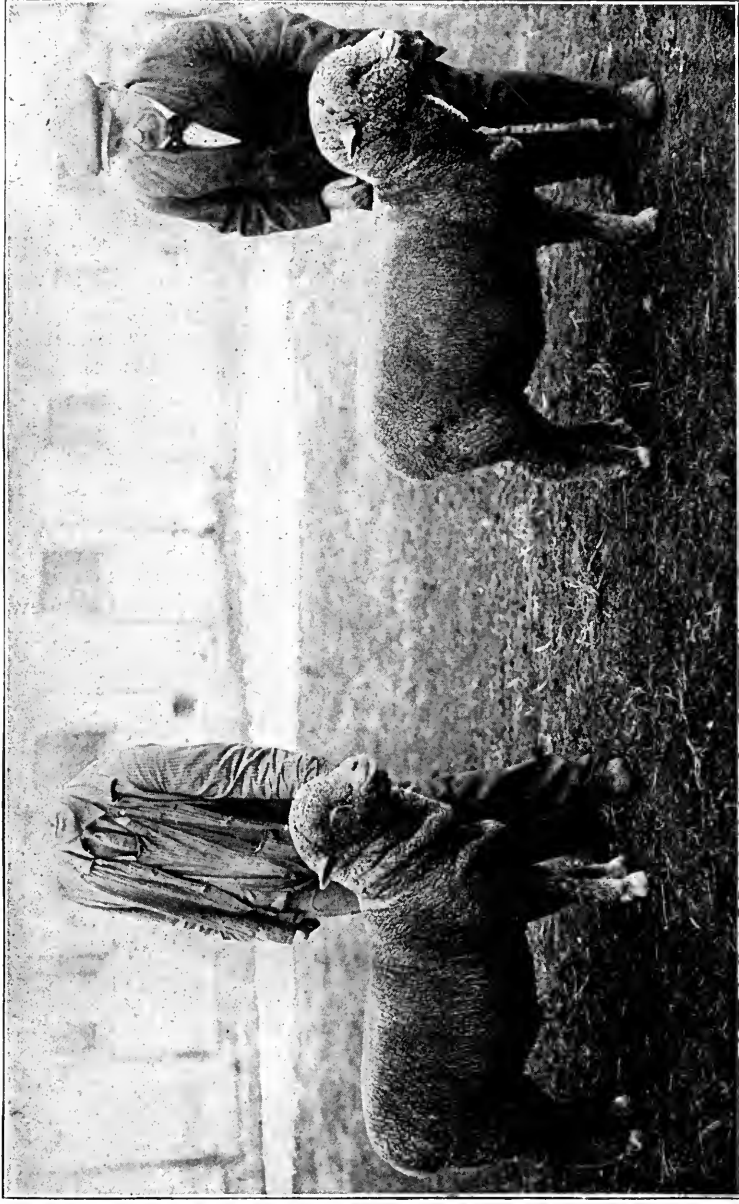
Allow the ram plenty of exercise at all seasons of the year.

The ram should have separate quarters from the ewe flock and remain in them except at mating time to avoid his worrying the ewes.

Rearing Lambs.—Little lambs are very dependent upon their mother's and the shepherd's care during the first few weeks of their lives. During this time about all that can be done to encourage their growth is to keep them in dry comfortable quarters and see that they are properly owned and nursed by their mothers.

Lambs that are not owned can be raised by hand where it is practicable to do so. Oftentimes it is possible to put a lamb with another ewe that has lost its lamb. Skinning the dead lamb and putting the skin on the lamb that is to have the foster mother, is one means employed to encourage a ewe to adopt the strange lamb.

Where lambs are raised by hand, the milk of a fresh cow testing high in butter fat should be regularly fed and in very small quantities (two to three tablespoonfuls), at intervals of two or three hours for the first few days. Gradually increasing the amount as the lamb seems to thrive, keeping bottle and



Fitted and shown by Shepherd Frank Kleinheing, Wisconsin College of Agriculture who stands at the right of the picture.

Rambouillet Wethers.

nipple thoroughly cleaned and the milk always heated at 92 degrees F. and never scalded, are precautions that insure success in hand raising the lamb.

The Lamb Creep.—As soon as lambs show indications of eating hay and grain, they should be encouraged to do so by having a separate pen in one corner of the barn or a convenient place in the field which they can enter by means of the lamb creep. This is made by constructing and setting up a panel consisting of two boards six inches wide to which slats three feet long, one inch thick and four inches wide are nailed far enough apart to permit the lambs to crawl through and not the ewes.



Hampshire Rams.

By Courtesy of Sherwood Bros.

Suitable troughs and racks for grain and hay enable lambs to eat and make much more rapid gains than they otherwise would. Do not make the troughs too deep and it is quite necessary to have a board fitted above the trough in a manner to keep the lambs from getting into it with their feet. This is easily done without interfering with the lambs eating at any time they may choose and saves the grain which they will not eat if soiled in any manner.

A Suitable Grain Mixture for Lambs.—Wheat bran four parts; whole oats two parts; finely ground corn meal two parts, and oil meal one part, is a good mixture. In warm weather reduce the corn meal and increase the proportion of oats. A fine grade of second cutting of clover or alfalfa provides the best roughage. Finely chopped roots when lambs are old enough to eat them and until lambs are put on pasture will be helpful. It pays well to feed lambs grain on pasture and one should bear in mind that the better the lambs are grown the stronger and better the flock will be for breeding as well as for mutton purposes.

Marking Lambs.—Every owner of sheep should have some system of marking his sheep and with pure bred lambs it is necessary to keep records of each individual for proper identification.

The Dana Ear Label is one of the most satisfactory methods of keeping individuals properly identified and these should be inserted the first or second day to insure against mistakes and to do the work most conveniently.

Castrating and Docking Lambs.—With the exception of the lambs that are to be retained for breeding purposes, all buck lambs should be castrated. Buck lambs retained for breeding purposes must be separated from the rest



Docking a Lamb.

of the flock at about three to four months of age, and given special care and feed. Allowing lambs to run uncastrated with the flock results in greater losses than perhaps many realize.

Choosing a bright day when lambs are one to two weeks old, having a pen bedded with clean straw in which to turn lambs, using a disinfectant to insure against infection, cutting off the lower third of the bag, drawing the testicles out quickly with the fingers or a pair of pinchers, and applying some of the disinfectant to the wound, accomplishes the act of castration successfully and without danger of losses.

All lambs should be docked. It is best to dock ram lambs five to seven days after they have been castrated for the reason that docking and castrating is most too severe a shock for best results. Ewe lambs should be docked at the age of eight to fourteen days.

Loss of blood is the principal difficulty in docking where methods of cutting the tail off with a knife or a chisel are employed. This is overcome by the use of the docking iron shown in the accompanying cut and which burns and sears the tail off in a manner to prevent any loss of blood. The shock does not appear greater than that from other methods.

Two men must be employed to dock and castrate lambs. With proper arrangements the work can be done rapidly and under no circumstances should it be neglected. Docking prevents filth and infection from maggots, saves wool and insures the safe breeding of ewes that otherwise will not be likely to get with lamb.

Dipping Ewes and Lambs.—Sheep require dipping to rid them of ticks and in some instances of lice and other parasites. After the ewes have been shorn, the ticks resort to the lambs. Eight to ten days after shearing when the weather is bright and sufficiently warm, the entire flock should be dipped. Many dip oftener, depending upon the necessity. Sheep should be examined for ticks, especially lambs purchased in the fall for feeding and dipped whenever necessary. Ticks will prevent profitable gains in spite of the best rations and feeding quality of lambs.

Use standard sheep dips following directions submitted with them. Avoid getting the dip into the ears, eyes and mouths of sheep and do not let sheep become chilled by remaining out nights or out of doors day times should the weather change and become cold.

Weaning Lambs.—It is best to wean lambs at the age of four and a half to five months. This offers the ewes a chance to regain strength and vitality when the breeding season comes on which is more important than giving the lambs the further benefit of their mother's milk.

Taking the lambs away from the ewes, turning them into a good pasture some distance removed from their mothers and not allowing them to go back again, is the best plan to follow in weaning. There is a less prolonged worry on the part of lambs and their mothers which is accompanied by better gains to both lambs and ewes.

Use of Rape.—Good pasture at weaning time and later in the fall when ewes and lambs make good use of green feed cannot be assured and it is therefore, a good practice to have a piece of rape on which lambs can be turned a part of each day or run regularly when they have become accustomed to it.

Bloat in Sheep.—When turned on new pasture, sheep are very subject to bloat and should be watched carefully. Green clover, alfalfa, and rape when wet at a more mature stage, are especially dangerous and should be pastured cautiously. Sweet, warm milk is an effective remedy for bloat. One-half pint given with a drenching bottle brings immediate relief if the sheep or lamb is not too far gone to survive from any ordinary treatment. Tapping may be resorted to when other methods fail, but should be the last thing to do to treat sheep for bloat.

Marketing Lambs.—The market for lambs is active from late summer until late spring and should be studied by one having lambs to offer. There are times when there is a scarcity of lambs on the market and one having lambs in good condition may find these times the best to market.

Lambs born in the early spring can be made to reach 80 pounds in weight in late summer. This is a most desirable weight for the market providing the lamb is fat and is in a good place to sell at this time to avoid the rush of many lambs that are put into the market a little later.

Lambs that are put onto the market in the fall sell mostly for feeders and at feeder prices and the producer must keep in mind the matter of feeding liberally if he hopes to realize the best prices at this season. Grass fed lambs are usually all sold by the middle of December and if a system of feeding can be adopted to have choice lambs ready between this time and the middle of January when the winter fed lambs begin to arrive on the market, one can secure good prices.

Late fed lambs that are ready for the market in April or possibly a little earlier when most of the winter fed lambs have been marketed, have little competition and may sell well, although the number of lambs that have been marketed previously and the demand, determine the kind of a price one will secure.

It is a safe rule to market lambs when they are fat and at the most desirable weight, providing the market is normal. Avoid putting "half fed" stuff on the market and being obliged to accept low prices paid for it.

The man having one or more carloads can always sell to a better advantage than the man with a smaller lot. This is true providing he can make up a load of uniform stuff which should always be done to the fullest extent possible. A more uniform appearance may be secured by clipping loose wool and tagging just a little about the tail. Expert buyers do not buy on appearance, but a favorable impression tends to make them more liberal and well marketed loads are an inspiration to the seller.

Lambs that are shipped should not be stuffed prior to shipping. Dry feed and a somewhat reduced amount enable them to reach the market in the best condition. Do not crowd the cars, but watch the lambs during shipment to avoid their piling up at one end of the car and becoming smothered.

Fattening Sheep.—Feeding and fattening sheep that have simply been grown and not fed grain to any extent on pasture, has always been an important branch of the sheep industry. Men who thoroughly learn the business maintain feeding stations where large numbers of lambs are purchased in the fall and fed during the winter. The margin between purchase and selling price and the gains in weight, are the source of profit in the business. Farmers who raise their own lambs or buy on the markets and men who have access to suitable sheds at convenient shipping points and near factories that supply refuse like beet pulp, pea vine silage and other refuse possessing feeding value, engage in this line of industry.

The Feeding Period.—Early spring lambs if not fattened on grass pasture can be fattened in the fall and marketed in December or January and in some instances earlier. Later lambs are fed twelve to fourteen weeks, depending upon their condition, and marketed in March or April. A feeding period of 100 days should secure a gain of 20 to 30 pounds per head and a suitable condition for the market. The market should be studied and the most suitable weights, approximately 80 pounds, provided.

Rations Suitable for Fattening.—Light, low grade and heavyweight screenings with clover or alfalfa, provide rations on which thousands of sheep

are fed in the vicinity of large grain elevators. Low grade screenings may be used in starting lambs on feed, but the heavy weight grades are necessary for finishing and are approximately one-third better than the low grade. Approximately one pound of screenings and two pounds of legume hay provide a suitable fattening ration when sheep or lambs have been worked onto full feed.

Under careful management, silage from corn, pea vines, cannery refuse and beet pulp fed at the rate of three to three and one-half pounds daily with one and one-half pounds or more of grain and a small amount of hay, provides a suitable ration.

Corn, barley and a combination of other concentrates that sheep will relish and that are reasonable in cost, fed in combination with hay, both fed in quantities that sheep will eat without waste and remain on feed constantly, provide suitable rations.

Helpful Suggestions.—Secure all the information possible that will be helpful in buying, feeding and selling intelligently.

Have pens arranged in a manner to do feeding conveniently and without disturbing the sheep any more than is necessary. Regularity and quietness are highly important factors.

Bring sheep onto full feed and make any necessary changes in the ration gradually. Provide pure, fresh water and keep salt constantly before them. Do not allow feeding troughs to become filthy.

Sheep eat and take on gains best in clear, cold weather. To avoid getting them off feed reduce the amount of feed on days that are warm, wet or lowery. Never feed more than sheep clean up readily.

It is useless to attempt to fatten sheep infested with ticks, lice or scab. They should be dipped before the feeding period begins.

Fresh air in abundance is necessary. Plenty of shed room should be provided to shelter sheep from storms. Exercise is not conducive to the largest gains and sheep feeding pens are usually provided with only small yards.

Lambs fed until late in the year may be shorn to good advantage six weeks before they are ready for market.

Be sure to barricade pens and yards to prevent dogs getting into them.

DISEASES OF SHEEP

GENERAL SYMPTOMS

Appetite depraved; poor in flesh; debilitated; craving dirt and litter; diarrhea sets in.—**Stomach Worms, Page 211.**

Bloated, distended abdomen.—**Bloat, Page 203.**

Bloating; refusal to eat; general uneasiness.—**Colic, Page 204.**

Bowels loose; cough husky and dry; some fever; coughing up worms; poor appetite; difficult breathing.—**Bronchitis, Page 203.**

Bowels tight; passing of hard, dry manure.—**Constipation, Page 205.**

Breathing difficult; skin papery; coughing and strangling fits; poor in flesh; often coughing up worms.—**Lung Worms, Page 208.**

Breathing difficult; worms coughed up; bowels loose; husky dry cough; some fever; poor appetite.—**Bronchitis, Page 203.**

Chill followed by fever; great thirst; cough; panting and heaving at the flanks.—**Pneumonia, Page 209.**

Cough husky and dry; some fever; poor appetite; loose bowels; coughing up worms; difficult breathing.—**Bronchitis, Page 203.**

Coughing and strangling fits; loss of flesh; often coughing up worms; breathing difficult; skin papery.—**Lung Worms, Page 208.**

Coughing; great thirst; chill followed by fever; panting and heaving at the flanks.—**Pneumonia, Page 209.**

Delirium; weakness; muscles tremble; gait staggering; swellings on body full of bloody fluid which oozes through the skin; some cases dying without warning.—**Anthrax, Page 203.**

Diarrhea following a debilitated condition; a poorness of flesh and a craving for dirt and litter.—**Stomach Worms, Page 211.**

Discharge from nostrils; head held low; sometimes difficult breathing.—**Nasal Gleet, Page 208.**

Discharge of watery nature from eyes and nostrils; sneezing; depression; poor appetite.—**Catarrh, Page 204.**

Discharge with a foul smell; swollen, tender, hot feet; lameness; in severe cases sheep cannot walk.—**Foot Rot, Page 207.**

Dull, yellow eyes; general debility; loss of appetite and flesh; wool rough.—**Nodular Disease, Page 209.**

Dying suddenly without warning; high fever followed by delirium; weakness; muscles tremble; gait staggering; swellings on body full of bloody fluid which oozes through the skin.—**Anthrax, Page 203.**

Eating dirt and litter; poor in flesh; depraved appetite; debilitated; diarrhea sets in.—**Stomach Worms, Page 211.**

Eating; refusal to eat; some bloating; general uneasiness.—**Colic, Page 204.**

Eyes and nostrils have watery discharge; sneezing; depression; poor appetite.—**Catarrh, Page 204.**

- Eyes dull and yellow; general debility; loss of appetite and flesh; wool rough.—**Nodular Disease, Page 209.**
- Eyes full of tears; eyes kept partly closed; animal avoids the light; parts streaked with red.—**Inflammation of the Eyes, Page 208.**
- Eyes kept partly closed; full of tears; sheep avoids light; parts streaked with red.—**Inflammation of the Eyes, Page 208.**
- Feet tender; hot, swollen; lameness; foul discharge; in severe cases sheep cannot walk.—**Foot Rot, Page 207.**
- Fever; husky, dry cough; poor appetite; loose bowels; coughing up worms; suffocating breathing.—**Bronchitis, Page 203.**
- Flesh poor; dull, yellow eyes; general debility; loss of appetite; wool rough.—**Nodular Disease, Page 209.**
- Head held low; sometimes difficult breathing; discharge from nostrils.—**Nasal Gleet, Page 208.**
- Heaving and panting at the flanks; coughing; great thirst; chill followed by fever.—**Pneumonia, Page 209.**
- Inflamed eyes; eyes kept partly closed; full of tears; streaked with red; sheep avoids light.—**Inflammation of the Eyes, Page 208.**
- Itching severe; great uneasiness.—**Scab, Page 211.**
- Lameness in one or more feet; parts hot, tender, swollen; foul discharge; in severe cases sheep cannot walk.—**Foot Rot, Page 207.**
- Maggots.—**Maggots from Blow Flies, Page 209.**
- Manure dry and hard; bowels tight.—**Constipation, Page 205.**
- Manure thin and watery.—**Diarrhea, Page 206.**
- Muscles tremble; fever followed by delirium; weakness; gait staggering; swellings on body full of bloody fluid which oozes through the skin; in some cases dying without warning.—**Anthrax, Page 203.**
- Nostrils and eyes have a watery discharge; sneezing; depression; poor appetite.—**Catarrh, Page 204.**
- Nostrils have some discharge; head held low; sometimes difficult breathing.—**Nasal Gleet, Page 208.**
- Panting and heaving at the flanks; coughing; great thirst; chill followed by fever.—**Pneumonia, Page 209.**
- Poor in flesh; debilitated; depraved appetite; craving dirt and litter; diarrhea sets in.—**Stomach Worms, Page 211.**
- Poor in flesh; violent coughing and strangling fits; often coughing up worms; breathing difficult; skin papery.—**Lung Worms, Page 208.**
- Skin papery; breathing difficult; coughing and strangling fits; often coughing up worms; poor in flesh; breathing difficult.—**Lung Worms, Page 208.**
- Sneezing; watery discharge from nostrils and eyes; depression; poor appetite.—**Catarrh, Page 204.**
- Strangling and coughing fits; poor in flesh; often coughing up worms; breathing difficult; skin papery.—**Lung Worms, Page 208.**
- Tears run from eyes; animal keeps eyes partly closed and avoids the light; parts are streaked with red.—**Inflammation of the Eyes, Page 208.**

Thirst abnormal; chill followed by fever; cough; panting and heaving at the flanks.—**Pneumonia, Page 209.**

Thirst abnormal; wool rough; general debility; poor appetite; constipation or diarrhea; manure full of worms' eggs if examined through a microscope.—**Fluke Worms, Page 207.**

Trembling of muscles; fever followed by delirium; weakness; gait staggering; swellings on body full of bloody pus which oozes through the skin; sometimes dying suddenly.—**Anthrax, Page 203.**

Uneasiness; refusal to eat; bloating.—**Colic, Page 204.**

Watery discharge from nostrils and eyes; sneezing; depression; poor appetite.—**Catarrh, Page 204.**

Weakness; trembling of muscles; fever followed by delirium; gait staggering; swellings on body full of bloody pus which oozes through the skin; dying suddenly in some cases.—**Anthrax, Page 203.**

Wool rough; general debility; poor appetite; great thirst; diarrhea or constipation; manure full of worms' eggs if examined through a microscope.—**Fluke Worms, Page 207.**

Wool rough; loss of flesh and appetite; dull, yellow eyes; general debility.—**Nodular Disease, Page 209.**

Worms coughed up; bowels loose; husky, dry cough; some fever; poor appetite; difficult breathing.—**Bronchitis, Page 203.**

Worms coughed up; breathing difficult; skin papery; coughing and strangling fits; poor in flesh.—**Lung Worms, Page 208.**

Yellow, dull eyes; general debility; loss of appetite and flesh; wool rough.—**Nodular Disease, Page 209.**

TREATMENT FOR DISEASES OF SHEEP

Anthrax.

This is a malignant, infectious disease to which all domestic animals are subject. Man himself can be infected from animals. It is more common in parts of the West and South. There are great losses in cattle, sheep, and mules. Anthrax is caused by a slender rod-shaped germ and is likely to occur near tanneries, the hides being infected, or in localities where the disease has existed before. It is sometimes contracted by man from infected wool.

Symptoms.—The symptoms vary. Sometimes the animal appears well and dies suddenly with little or no warning. In other cases there is a more gradual development of the disease, showing high fever which may later develop delirium. The animal shows great weakness, the muscles tremble and the walk is staggering. There are often swellings on the body filled with a bloody fluid which oozes through the skin.

Treatment.—Great care should be taken to prevent the spread of the disease. A vaccine has been discovered which is very effective. It can be purchased on the market. Medical treatment is of little value; however it is well to isolate the animal until sure of the nature of the disease. Change food and water and use disinfectants freely such as coal tar preparations. A dead animal should be buried deeply in lime. Be careful not to get any blood into a scratch on the hand or body. A report should be made to the State Veterinarian.

Bloat.

The cause is fermentation of food which causes gas to generate, swells the intestines and develops much pain.

Symptoms.—The most noticeable symptom is the bloated and distended appearance of the abdomen the most prominent part of which is the place to tap.

Treatment.—Burn a slender knife blade in a fire to sterilize it and then use it after clipping the wool. Give one-half pint cow-warm milk; repeat after thirty minutes if needed. Recommended by Frank Kleinheim, herd shepherd at University Farm, Madison, Wis. Mr. Kleinheim says he has lost but one sheep with bloat in thirty-five years since using this remedy. This is an easy and safe remedy.

Bronchitis.

This is an irritation of the bronchial tubes, affecting both lambs and young calves. It develops from wrong treatment while sick, or from eating decayed food. Eggs or flies are laid on the food and hatch into long worms which distribute themselves through the bronchial tubes.

Symptoms.—There is some fever; a cough; poor feeding and looseness in

bowels; worms come out; the coat is dry, and there is trouble in breathing.

Treatment.—Isolate the sheep; give plenty of vegetables, grass and grain. The usual remedy and most widely used is turpentine poured into the feed or water. One small teaspoonful can be safely used. Linseed or castor oil will also be found good. Feed a few raw potato parings once in awhile. Drench the sheep properly. Coal tar in hot water makes a good solution in which to soak a bag to put over the head for inhaling. Vinegar is good too. Be careful not to strangle the animal.

Castration.—This consists in removing the reproductive organs of the males. Lambs are castrated when about six days old. If possible have someone hold the lamb for you. Cut off quite a share of the lower portion of the pouch, pull out the testicle and cut off the cord. Apply a carbolic acid solution (1 teaspoonful to a cup of water) to the parts and be sure the instruments used are free from germs and that the hands are clean. An old ram may bleed to death in a short time after being castrated unless the cord is tied. Catgut, silk or linen thread may be used for this and the thread left on for several days. After castrating dress the wound at least once a day and dip the instruments in an antiseptic solution before using them again.

Catarrh—Influenza.

Catarrh is really a cold in the head which is chronic and is brought on by catching cold. It may be passed from one animal to another. It usually affects the membranes of the breathing organs. Animals are usually constipated.

Symptoms.—There is a watery discharge from the nostrils and eyes; sneezing; depression and loss of appetite. The discharge may become like pus.

Treatment.—Remove to comfortable quarters. Prepare the following drench: Pour one quart of boiling water over two ounces of composition powder; let it stand one hour in a warm place; pour off the clear liquid and add two ounces of sugar of milk. Give a wineglassfull once or twice a day. Keep the bowels open by feeding vegetables, like carrots, potatoes and turnips. An onion once in a while has been found good by many farmers. Epsom salts in four to six ounce doses will cure influenza when taken early. Give one dose and repeat if necessary. Use all the boric acid a pint of warm water will dissolve and inject while warm into the nostril and throat.

Colic—Stretches.

Running in a pasture during a cold windy day as well as eating indigestible food, frozen vegetables and exposure cause colic.

Symptoms.—General uneasiness, refusal to eat and more or less bloating with some rolling and indications of pain show colic.

Treatment.—If the bowels are constipated give four or five ounces of Epsom salts. Hot water with a little camphor or camphor gum added is good.

Give one teaspoonful each of ginger and baking soda. Dissolve in water and give as a drench. Do not hold the head high in drenching as there is danger of strangling. A teaspoonful of peppermint in a cup of water as a drench has been recommended by many sheep raisers.



Drenching the Sheep.

Precaution should be taken in drenching the sheep in order to avoid choking. Note size and shape of bottle and how sheep is held in a manner to allow it to swallow naturally.

Constipation in Lambs or Sheep.

An injury to the bag may make it necessary to take the milk from it. When this is done there is considerable effect on the unborn lambs and they are predisposed to constipation. Proper feed and care will do a lot toward

regulating the bowels in the new born lambs. A little sugar in milk and water has been given with good results.

Treatment.—In lambs empty the lower bowel by the injection of warm soapy water and give a laxative diet or take a small pointed piece of pure white soap about an inch and a half long and after dipping it in sweet oil, insert in the rectum, pushing it well in. Give one teaspoonful of sweet oil once or twice a day.

The same treatment may be given sheep in increased quantities.

Diarrhea.

This is usually the result of mismanagement and neglect; the feeding of indigestible food; sudden changes of diet, and exposure. In lambs infection from the udder and chilling are common causes.

Treatment.—Diarrhea should not be checked suddenly as it is an effort of nature to rid itself of irritants. Give a change of feed and pure drinking water. If the case is obstinate try any good home remedy for diarrhea. Jamaica ginger following cotton seed oil or an ounce of linseed oil will give good results. A small lamb may be given one tablespoonful of castor oil with good results. This is both healing and cleansing. For a sheep the dose may be increased to one-half teacupful. One dose will probably be sufficient. Milk in which black pepper is mixed is good for diarrhea.

Docking.

In the younger lambs the pain is not great especially if cut at a joint. If the skin is drawn tight from the tip of the tail after cutting it will leave an overhanging section of skin that can be tied with a cord. Kerosene oil or turpentine applied to the wound will help it heal rapidly. Lard or eggs can be used as healing applications.

Dysentery—Bloody Flux.

This disease is usually the result of obstinate and neglected diarrhea, or eating improper food and having continued indigestion. It is nature's method of attempting to throw off some irritating material in the bowels.

Symptoms.—There is fever; extreme debility; rumbling of the bowels; thin discharge mixed with mucus and sometimes streaked with blood, and more or less pain.

Treatment.—Place the animal in comfortable quarters; give light nutritious diet such as gruels and mash for a day or two. Flour and water or milk in a paste form gives very good results. A teaspoonful of Jamaica ginger acts well as a stimulant. Give two or three ounces of castor oil to heal and cleanse the stomach and bowels, and follow up with tonics and a laxative diet.

Fluke Worms.

All sheep are subject to liver flukes which cause the so-called liver rot. They are small flat worms from one-fourth to one-half inch long, and multiply very rapidly where there is stagnant water; they make their way to the liver and there develop.

Symptoms.—General debility; the wool is rough; the appetite gone; and there is abnormal thirst. There may be diarrhea, or the bowels may be constipated. If the discharges are examined with a microscope they will be found to contain many of the eggs. Swellings appear on parts of the body.

Treatment.—The best treatment is to prevent the disease by removing the animals to high and dry pastures; see that the drinking water is pure. Medicines, except tonics, are of little value in this disease. Give plenty of nutritious food, and feed plenty of rock salt and lump sulphur. Charcoal may be given mixed with a little ginger.

Foot Rot.

Foot rot is an inflammation of the horny structure of the foot and skin connections. Exposure in wet pastures; general debility; contagion, and filthy surroundings usually develop it.

Symptoms.—The animal is observed to limp. Sometimes the whole four feet are affected. The parts are hot, swollen and tender; there will be a foul discharge of fluid and the animal will soon be unable to walk; death may ensue.

Treatment.—The animal should be isolated; the treatment must be immediate and thorough. Ascertain the cause if possible and remove it. In mild cases a little tar rubbed on will be effective. If the disease has reached a putrid type, clean the foot by washing, or turn the animals into wet grass; remove all loose or superfluous horn. Then wash the parts with a solution made by mixing four ounces pyroligneous acid with three ounces of water. Saturate a piece of cotton with this solution and apply, changing when necessary. If a number of animals are to be treated it can be accomplished more rapidly by standing them for a short time in a wooden trough, which contains one inch depth of the following solution: Linseed oil, two pints; pyroligneous acid, four pints; kerosene, one pint. Any amount can be made in the above proportions. Improve the general condition with the following tonic: one ounce each; powdered sassafras, charcoal and golden seal, one-half ounce sulphur, two drams powdered asafetida, two pounds flaxseed. Mix and give a tablespoonful twice a day in the feed.

After cleaning the foot carefully saturate the affected parts with turpentine, then apply butter of Antimony; bandage the parts and stand on clean, hard floors. This treatment has done much to relieve communities of this disease, especially in low, swampy country. Kerosene oil is fine for sheep with foot rot to walk through.

Grubs in the Head or Nasal Gleet.

This is a troublesome pest causing discomfort and injury to sheep. Grubs in the nostrils are caused by a small gad-fly which deposits her eggs in the nostrils of the sheep. In a few days the eggs are hatched and the young larvae passes up the nostrils into the nasal cavities, where they develop, causing the sheep much pain and annoyance. The irritation causes the greatest loss. As a disease it is not fatal.

Symptoms.—There is irritation of the nose with some discharge. The sheep holds its head low; sometimes there is difficulty in breathing.

Treatment.—The best treatment is prevention. Smear the noses of the sheep with common tar, put the sheep in a dusty lane or open field where they can thrust their noses into the dust. This to be done during the hot summer months when the gad-fly bothers the sheep most. Imagine how the sheep must feel bothered with these worms and you will aid in preventing them from getting into the head. Sulphur can be burned so it may be inhaled, or a spray of turpentine and kerosene oil will be found very good for removing and killing the little eggs and maggots. A paste of pitch pine applied on the nostrils will be found satisfactory. Salt saturated with tar is used by many farmers. It is placed in troughs where the sheep can get at it.

Inflammation of the Eyes.

This trouble affects the lining membranes of the eyelids and eyeball and is caused by sand or little sticks getting into the eye.

Symptoms.—Tears run from the eyes which the animal keeps partly closed and avoids the light. The eyelids and eyeballs are streaked with red and there is pain.

Treatment.—Bathe the eyes with hot or cold water twenty minutes at a time three or four times a day. Separate the animal from the flock. Salt water is one of the best and simplest remedies. A poultice of bread crumbs and mashed potatoes has proven good in many instances. Boracic acid is the usual drug store remedy and is fine as a cleanser. It should be dissolved in water.

Lung Worms.

In the lungs of sheep a thread-like worm is found which causes coughing, sneezing and a discharge of mucus from the nose. The same worm infects pigs and calves.

Symptoms.—There is a falling away in flesh; also violent fits of coughing and strangling, often raising mucus which contains the worms. Usually the breathing is difficult and the skin becomes exceedingly papery.

Treatment.—The best preventive treatment is a frequent rotation of pastures, thus preventing any pasture from becoming greatly infested. Isolate the sick sheep and give nourishing, easily digested food. Inject into the windpipe a mixture of one part turpentine in two parts olive oil, once a day for three days, using the hypodermic syringe. Or use one-half ounce carbolio acid,

four ounces turpentine and eight ounces olive oil; mix well and inject into the windpipe by means of a hypodermic syringe once a day for three days. Place the animal on his rump and hold between the knees while inserting the hypodermic needle into the windpipe two or three inches below the throat, injecting the medicine gradually.

Maggots From Blow Flies.

Most of the maggots on animals are caused by the flesh-fly. The adult fly deposits her eggs (larvae) on the surface of wounds or in the wool of sheep where manure and other filth has collected. The larvae, as they develop, will work their way into the skin, causing sores. When the tails of lambs are docked, the cut surface must be treated with a proper antiseptic and the lamb watched to guard against the fly.

Treatment.—The essential treatment is cleanliness. Heavy woolled sheep should have all wool cut away from parts where it is liable to become soiled and filthy, especially in the spring before the flies come. In case a wound has been attacked, all dead tissue, and as many of the parasites as possible should be removed. Oil or tar, turpentine and lard or kerosene oil are about the best and handiest remedies for preventing the flies from laying the eggs, and also kills the eggs that have been laid.

Nodular Disease.

This disease is caused by a parasitic worm which burrows into the walls of the intestines causing nodules or bunches. The trouble is most common and serious in the South and older sheep are more often affected than lambs. The disease is spread by allowing well sheep to graze on pasture which has been used by diseased sheep. Lambs should be prevented from getting the disease.

Symptoms.—General debility; loss of appetite and flesh; the eyes are dull and yellow and the wool is rough.

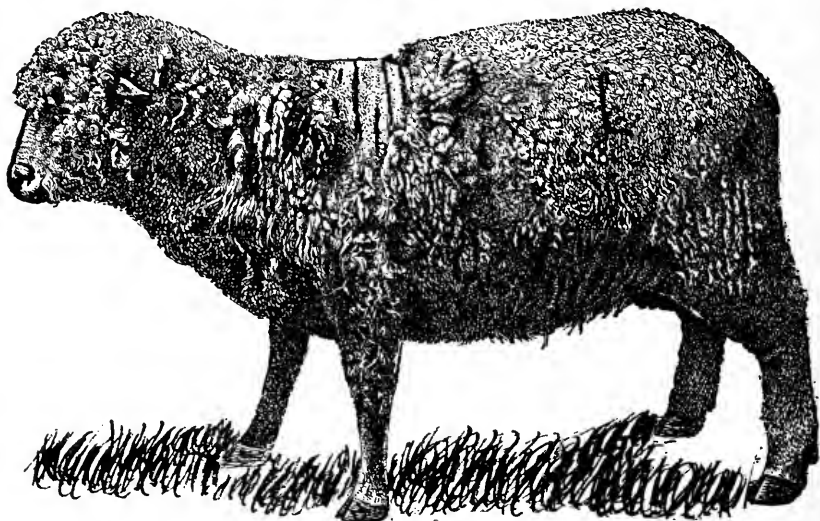
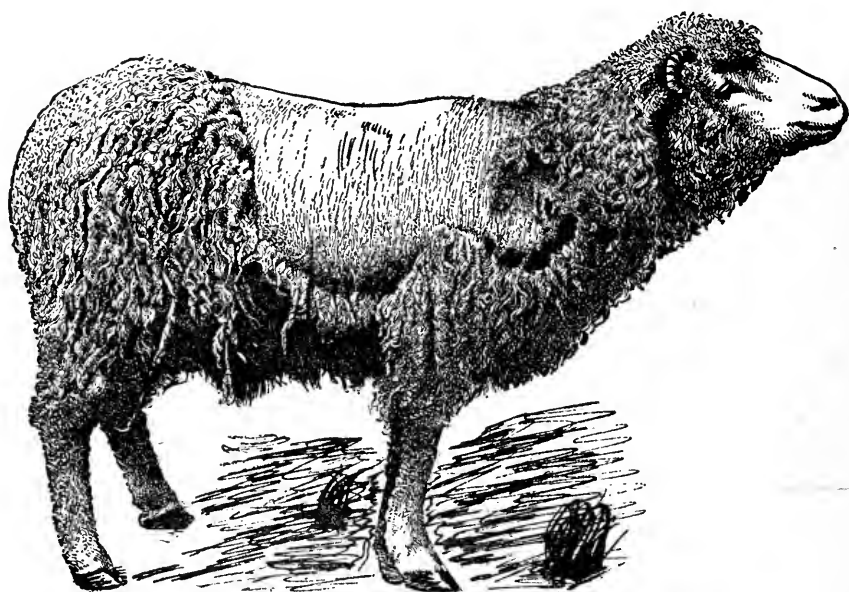
Treatment.—No medicinal treatment is satisfactory in ridding sheep of this trouble. Prevent the lambs from grazing after their mothers if there is suspicion of the disease existing. They may be kept on bare lots and fed green crops from racks, carefully removing all food remaining after each feeding. In this way there is little danger of lambs becoming infected even if the ewes are badly attacked by the parasite. The ewes which are infested may thus be kept for breeding purposes without danger of transmitting the disease to the lambs.

Pneumonia.

This is the same in sheep as in all other animals affected with it, and develops from exposure to cold which can in most cases be prevented. The simple diseases are not serious in themselves, but it is what they may develop into that should make one especially careful in prevention.

Symptoms.—A chill, followed by fever, great thirst; panting and heaving at the flanks; quickened respiration and coughing.

Treatment.—Put the animal in clean dry quarters where there is plenty of fresh air. Place upon the tongue ten drops of fluid extract of gelseminum,



Sheep With the Scab.

morning and night. Dissolve one ounce of chlorate of potash in one-half pint of flaxseed tea, and give it daily as a drench until the animal is better. Good hot applications to the chest and lungs are usually recommended. **Ten**

drops of aconite should be given for the fever. Jamaica ginger (1 teaspoonful) in a glass of milk will warm the patient and ease the pain.

Scab.

Scab and mange are somewhat similar and can be treated practically the same. A little insect digs its way under the skin through filth and dirt that has collected. Scabs form and the wool comes off in patches. Low ground and damp stables are bad and sheep should be kept in dry clean pens which can be easily cleaned.

Symptoms.—There is an extreme irritation and itching which causes great uneasiness. Unless the affected animal is isolated this disease will soon spread through the flock as it is very contagious. Rubbing against posts and fences is common. Wherever great patches of wool are seen hanging to posts there is usually this affection among the sheep.

Treatment.—Five or six pounds each of tobacco leaves and sulphur, and 25 gallons of water makes a valuable preparation. Scald the tobacco in part of the water and add the sulphur after cooling to a comfortable heat by adding cold water. Dip the sheep in this solution while it is warm for about three or four minutes. This dip cannot be used strong enough to kill the eggs of the mite. It is therefore necessary that the sheep be dipped again in about ten days as the eggs will have hatched by that time. In this way the young mites are destroyed.

A creolin dip or wash is very good. Crude petroleum and sulphur are used by many farmers. Be careful of matches used around the dip. A good double sectioned trough can be made for dipping and draining sheep. The draining section should be elevated somewhat.

Stomach Worms.

These are small hair-like worms about three-quarters of an inch long which infest the stomach of sheep, goats and calves, causing a most serious disease. Lambs are more often affected than sheep. Wet seasons or marshy land seem to be the best places for them to infect sheep.

Symptoms.—The animal loses flesh, becomes debilitated; shows a depraved appetite, craving dirt and litter; a diarrhea sets in which may be serious.

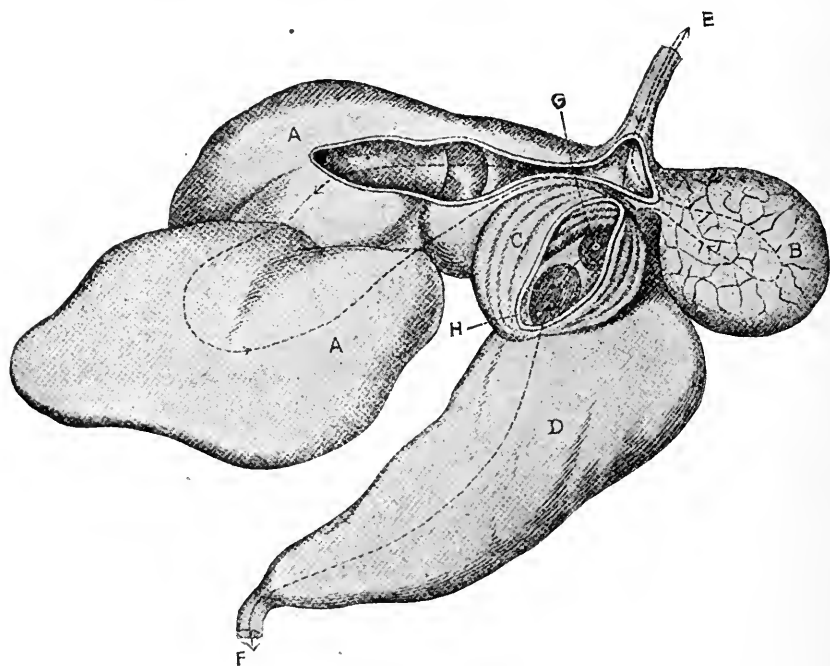
Preventive Treatment.—A good preventive treatment is in a frequent rotation of pastures so that none of the pastures will become too thoroughly infected.

The sheep showing signs of this disease should be separated from the rest of the flock. The same treatments given here are good for calves. One teaspoonful of turpentine to a cup of sweet milk is good. One tablespoonful of gasoline in a half cup of milk makes a splendid remedy. Repeat the dose every three days and if there is no improvement at the end of ten days repeat again every three days for two or three treatments. One of our authorities for this is the Ohio Experiment Station, which advocates its use.

Ticks.

The sheep tick is an insect which does not multiply very rapidly, but which is very troublesome in a flock. The so-called sheep tick is really not a tick but a fly. It is easily killed by any mange cure.

Treatment.—The parasites may be easily exterminated by dipping the sheep in an infusion of tobacco. A preparation for that purpose is now manufactured, and can be obtained at any drug store with full directions for use. The best time to dip sheep is immediately after shearing, as the solution then readily comes in contact with the ticks. Sifting wood ashes in the wool often drives ticks away. Glover's mange cure is very good.



Stomach of Sheep.
Action of Stomach.

Stomach of ruminants.

Stomach of a full-grown sheep, $\frac{1}{2}$ natural size (after Thanhofer, from R. Meade Smith's *Physiology of Domestic Animals*): *a*, rumen, or first stomach; *b*, reticulum, or second stomach; *c*, omasum, or third stomach; *d*, abomasum, or fourth stomach; *e*, esophagus, or gullet, opening into the first and second stomachs; *f*, opening of fourth stomach into small intestine; *g*, opening of second stomach into third; *h*, opening of third stomach into fourth.

The lines indicate the course of the food in the stomachs. The incompletely masticated food passes down the esophagus, or gullet, into the first and second stomachs, in which a churning motion is kept up, carrying the food from side to side and from stomach to stomach. From the first stomach regurgitation takes place; that is, the food is returned through the gullet to the mouth to be more thoroughly chewed, and this constitutes what is known as "chewing the cud." From the second stomach the food passes into the third, and from the third into the fourth, or true stomach, and from there into the intestines.

SWINE PRODUCTION

The Economy of Pork Production.—No other farm animal produces meat more economically than the hog. Pork and pork products are important food articles and hog raising has steadily increased with the country's rapidly growing population. The economy of the hog in converting feed into edible flesh is deserving of consideration by every farmer as well as by everyone concerned in the consumption of food. The well-filled pork barrel and supply of lard, ham and bacon greatly reduce the cost of living. These products are also available to all classes of people at prices that compare favorably with other kinds of meat.

The hog is a great feeder and not particular in his appetite. He is, therefore, highly adapted to converting household garbage, unmarketable vegetables, fruit, grain, grass and numerous forage plants, dairy by-products and even marketable grain into meat and cash. Approximately fifty percent less feed is required by the hog to make a pound of gain than is required by the steer. The hog also dresses 75 to 80 percent of his live weight as compared with 55 to 65 percent in the case of the steer. Henry and Morrison in "Feeds and Feeding" have summarized data from over 500 feeding trials and show the economy of gains made by pigs ranging from 15 to 350 lbs. in live weight. In considering the feed eaten, 6 lbs. of skim milk or 12 lbs. of whey are rated as equal to 1 lb. of grain.

Gestation Period, Frequency and Size of Litters for Brood Sows.—The average normal period of gestation for the brood sow is 112 days. The period may range from 100 to 108 days for young sows and 112 to 115 days for old ones. Under favorable conditions the sow may be made to raise two litters a year. In such instances the spring litter must be early and weaned at not less than three months of age or else the sow must be bred on the third to seventh day after farrowing. In the latter case the pigs should be weaned in sufficient time to allow the sow to regain strength and properly nourish the unborn pigs of the second litter. Late fall pigs, where winters are rather severe, never do as well as spring pigs and the earlier the second litter can be produced the better. Only where the conditions are suitable for an abundance of feed and giving the pigs suitable care is it advisable to try to raise more than the one litter a season.

Litters vary in size according to the age, care and condition of the sow and the prolificacy of the family from which she comes. The vigor and potency of the boar is also believed to be a factor in determining the size of litters. Poorly developed boars and those that are overworked during the breeding season, should not be used. Brood sows four to five years old produce larger litters than gilts bred at the age of eight months. Old sows that become heavy and clumsy do not raise as large a percentage of their litters,

however, as do young sows and one must use judgment in keeping older sows for breeding purposes and exercise greater care to avoid losses at farrowing time. The feed for maintenance, success with which sows naturally mother their pigs, character and size of litter ordinarily produced, value of sow as a pure bred and the amount of time one has to devote to sows at farrowing time, are factors determining whether one shall depend upon holding over sows from year to year for possibly five or six years or depend upon gilts or younger sows for producing litters.

Relation of Weight of Pigs to Feed Consumed and Rate of Gain.

Weight of Pigs.	Actual Average Weight, Pounds.	Number of Animals Fed.	Average Feed Eaten per Day, Pounds.	Feed Eaten Daily per 100 lbs. Live Weight Pounds.	Average Gain per Day, Pounds.	Feed for 100 lbs. Gain, Pounds.
15 to 50.....	38	174	2.2	6.0	0.8	293
50 to 100.....	78	417	3.4	4.3	0.8	400
100 to 150.....	128	495	4.8	3.8	1.1	437
150 to 200.....	174	489	5.9	3.5	1.2	482
200 to 250.....	226	300	6.6	2.9	1.3	498
250 to 300.....	271	223	7.4	2.7	1.5	511
300 to 350.....	320	105	7.5	2.4	1.4	535

Types and Breeds of Hogs.—The following tabulation briefly states the types, breeds and characteristics of the more prominent breeds of hogs in America. The lard type of hog is by far the more prominent on farms in the United States. In a few instances a premium is paid for choice bacon hogs of the bacon breeds, but the larger supply of bacon in this country is supplied by hogs of proper size and condition selected from the numerous lots of hogs of light character that frequent the packing house centers.

Hogs of the lard type include the breeds that are short legged and that have deep, broad and thickly fleshed bodies. The flesh is especially thick in the region of the back, hind quarters and shoulders and produces pork chops, hams, shoulders, fat pork and lard in much greater quantities than do the bacon types. The lard type is largely of American origin and is the result of selecting hogs that excel in growing quickly and fattening readily on liberal allowances of feed. Turning them to market at six months of age weighing 200 lbs. is evidence of their early maturing qualities. Hogs of the bacon type have been selected and bred to produce long, deep bodies, comparatively narrow, and are long legged and long in the head. The flesh over the entire body is thin in comparison with the lard type of hog and produces cuts of pork most excellent in quality and highly adapted for bacon purposes. They make a rapid growth without the tendency and quality of fattening possessed by the lard type of hog. Bacon hogs dress 70 to 75 percent of their live weight as compared with 75 to 85 percent in the case of well developed hogs of the lard type. In certain localities of Canada and the United States, considerable attention has been devoted to the breeding of bacon hogs of the specific bacon



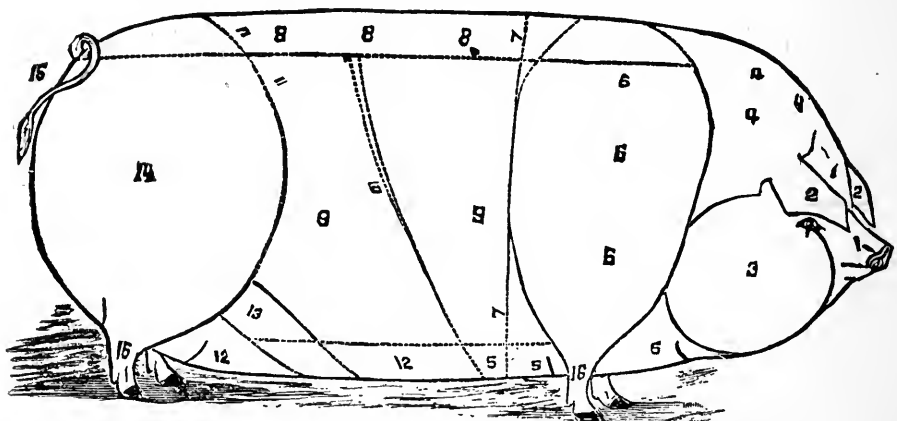
A LARD TYPE BOAR (Duroc Jersey).

The boar should possess a strong back, good bone, stand well on his feet and be comparatively smooth in body.

By courtesy of J. J. Fisher, Janesville, W. Va.

breeds. Only in a few instances are prices paid that warrant specialized breeding and feeding to produce choice bacon, otherwise the bacon breeds would undoubtedly receive greater attention. Under conditions where corn and fattening feeds are not grown successfully or are too expensive for fattening purposes, and where crops and dairy by-products suitable for growing pigs in a thrifty condition are provided, the production of bacon hogs for supplying home cured pork and furnishing the market with a desirable type of bacon hogs may well be encouraged.

Selection of Breed Important.—Under any circumstances or conditions it is profitable to select a distinct breed of hogs and to aim to secure hogs of uniform type, finish and quality. Uniformity in type, size and feeding quality insures to the grower of hogs the best market price. It is often said that the



Parts of a Hog.—1, Head; 2, Ears; 3, Jaw; 4, Neck; 5, Brisket; 6, Shoulder; 7, Girth around Heart; 8, Back; 9, Sides; 10, Ribs; 11, Loin; 12, Belly; 13, Flank; 14, Ham; 15, Tail; 16, Legs.

hog responds more quickly to good breeding than any other farm animal. The differences in the improved breeds are confined to the shape of the head, carriage of the ear, length and depth of the body and legs, the average size at maturity and the color. It may be said that more depends upon a careful selection of suitable individuals and strains and the painstaking management after one has selected a breed, than upon the breed. The pure bred boar and a herd of good bodied pure bred or grade sows are essentials to success in pork production.

Selecting the Brood Sow.—There is much to be gained in exercising good judgment in the selection of brood sows. High grade or pure bred sows from large, thrifty litters and having the conformation and qualities of the lard or bacon type, as the case may demand, tends to insure best results. The score cards for hogs of the lard and bacon types will be helpful in giving consideration to all the parts that combine to give the most satisfactory conformation and character for sows of these types.

TYPES AND BREEDS OF HOGS.

Type.	Breed.	Nativity.	Weight at Maturity.	Distinguishing Characteristics.
Lard, most commonly noted.....	Berkshire.	England, Counties of Berkshire and Wilts.	Boars, 500 Sows..400	Black with white on face, tail and feet. Face well dished. Ears erect, inclining forward. Legs medium to long.
	Chester White.	Pennsylvania, Chester County.	Boars, 600 Sows..400	Pure white; bluish-black spots on skin do not disqualify, but are not desirable. Face comparatively straight. Ears droop forward, breaking over about one-half the length. Legs medium to short.
	Duroc-Jersey.	New York, Saratoga County.	Boars, 600 Sows..500	Red, varying from light to dark. Face straight or slightly dished. Ears droop forward, the top third breaking over. Legs short.
	Poland-China.	Ohio, Butler and Warren Counties	Boars, 500 to 700 Sows, 400 to 500	Black with white on face, legs and tail; most common and popular. Face straight from eye to nose. Ears fine, outer third breaking over into neat droop. Legs short. Medium and large types exist.
Lard, not commonly noted.....	Cheshire.	New York, Jefferson County.	400 - 600	White. Face slightly dished. Ears small and erect. Body and legs inclined to be long.
	Essex.	England, Essex County.	400 - 500	Black. Face short, slightly dished. Ears erect. Body inclined to be chunky.
	Suffolk.	England, Suffolk County.	200 - 300	Yellowish white. Face short and dished. Ears small and erect. Body chunky. Legs short.
	Small Yorkshire.	England.	180 - 200	White. Face very short and dished. Ears erect. Body chunky and short. Legs short.
	Victoria.	Indiana.	450 - 600	White. Face medium dished. Ears small and erect. Body broad and deep. Legs moderately long.
Bacon.....	Hampshire.	England, County of Hampshire.	300 - 500	Black with white band about the body. Face straight and medium long. Ears erect, inclining forward. Body moderate in depth, length and width. Legs comparatively long.
	Large Yorkshire.	England, Yorkshire and Lancaster Counties.	600 -1000	White. Face medium long, dished. Ears should be carried upward, with slight forward droop. Body long and deep. Legs comparatively long.
	Tamworth.	England, Stafford County.	450 - 600	Red, varying from light to red. Face long and straight. Ears erect, inclining forward. Body long, deep and narrow. Legs, long.



A BACON TYPE BOAR (Tamworth).

It is desirable to have length and depth of body and good quality without too much thickness of flesh in bacon hogs.

SCORE CARD FOR HOGS OF LARD TYPE.

SCALE OF POINTS	Pos- sible score	Points deficient		Points deficient	
		Stud- ent's score	Cor- rected	Stud- ent's score	Cor- rected
GENERAL APPEARANCE—25 POINTS					
Weight, estimated in lbs.....					
Weight.....	6				
Form, deep, broad, low, long, symmetrical, compact, standing squarely on legs.....	8				
Quality, bone clean; hair silky; skin soft; head and ears refined, evenly covered with firm flesh.....	8				
Disposition, quiet, docile.....	3				
HEAD AND NECK—10 POINTS					
Snout, medium length, not coarse.....	1				
Face, short, cheeks full.....	1				
Forehead, broad.....	1				
Eyes, large, mild, full, bright, wide apart.....	1				
Ears, medium size, fine, soft.....	1				
Jowl, strong, neat, broad.....	2				
Neck, thick, medium length.....	3				
FOREQUARTERS—15 POINTS					
Shoulder, symmetrical, broad, deep, compact on top.....	6				
Breast, wide prominent, well let down.....	4				
Legs, straight, short, feet and pasterns strong..	5				
BODY—30 POINTS					
Chest, deep, broad; girth large.....	6				
Sides, deep, lengthy and full.....	8				
Back, broad, slightly arched, thickly and evenly fleshed.....	6				
Loin, thick, wide and strong.....	5				
Belly, straight, even, and firmly fleshed.....	3				
Flank, low and well fleshed, girth large.....	2				
HINDQUARTERS—20 POINTS					
Hips, wide apart, smooth and well covered....	3				
Rump, long, wide, evenly fleshed, smooth.....	4				
Hams, firm, heavily fleshed, deep and wide....	8				
Legs, straight, short; feet and pasterns strong..	5				
Total.....	100				

(Score card used at Wisconsin College of Agriculture.)



A LARD TYPE SOW (Berkshire).

Good length of body, an arching back, a roomy good sized body and excellent quality are characteristics to be sought for in the brood sow. *By courtesy of Sutton Farm, Lawrence, Kan.*

SCORE CARD FOR HOGS OF BACON TYPE.

SCALE OF POINTS	Per- fect score	Points deficient		Points deficient	
		Stu- dent's score	Cor- rected	Stu- dent's score	Cor- rected
A. GENERAL APPEARANCE—					
Size, well developed for age.....	5				
Form, long, smooth, all parts proportionately developed.....	10				
Quality, hair fine; bone clean and strong; flesh firm and smooth.....	10				
Condition, well covered with firm flesh, but not heavily loaded with fat.....	6				
Style, active and sprightly, and standing well on toes.....	4				
B. HEAD AND NECK—					
Snout, medium length and moderately fine.....	1				
Face, broad between eyes; poll, broad and full..	1				
Eyes, good size, full and bright.....	1				
Jowl, fair width and muscular, but very neat ..	2				
Ears, moderately thin and fringed with fine hair.	1				
Neck, medium length and muscular.....	2				
C. FOREQUARTERS—					
Shoulders, smooth and very compact.....	6				
Breast, good width and full.....	3				
Fore Legs, set well apart; bone clean and strong.	4				
D. BODY—					
Back, medium width, rising slightly above the straight line.....	6				
Loin, wide as rest of back, strong and full.....	5				
Ribs, good length and moderately arched.....	4				
Side, fairly deep; long, smooth and straight....	8				
Heart Girth, full, filled out even with side of shoulder.....	5				
Flank, full and low.....	2				
E. HINDQUARTERS—					
Rump, same width as back; long.....	4				
Ham, full, thigh tapering.....	6				
Hind Legs, medium length; bone, clean and strong.....	4				
Total.....	100				

(Score card used at Wisconsin College of Agriculture.)

Motherly Disposition of Brood Sow Essential.—In addition to a careful consideration of all the parts mentioned in the score card, the following features and characteristics should be considered in selecting the sow. Select the sow which is more roomy than the score card suggests and which at the same time has a slightly arching back. The disposition and general behavior should indicate motherly qualities. A gilt or sow of mean disposition or lacking in motherly instincts, seldom gives satisfaction however good she may be in conformation. More can often be judged in this respect after the sow has raised a litter, although one accustomed to handling hogs will not go far wrong in selecting the young gilt.

Select the sow that has 10 or 12 good nipples. After the first litter is born there will be opportunity to judge of the sow's milking qualities which should be taken into consideration in deciding whether or not she will be retained for further breeding purposes. One should also guard against selecting sows that are deaf or that have bad habits of catching and eating chickens or being breachy. Deaf sows are sure to kill many of their pigs by lying on them.

In mating young sows to a large mature boar, or in using a young boar on old sows, it is well to have some form of breeding crate to give the younger animal advantages that are desirable and in many instances necessary. Patent crates noted in swine journals serve the purpose best, although an ingenious home device may answer.

Selection and Care of the Boar.—The boar should be a pure bred, representative of his breed in all instances and possess all of the most desirable features and characteristics of this type and breed. He should be more compact and will naturally possess heavier bone than the sow if he is a good individual. He should combine size and quality and possess a masculine appearance as he approaches maturity. He should have good feeding quality and mature rapidly, which are characteristics highly desirable in pigs that are being grown and fitted for the market.

The pedigree or family from which the boar comes is deserving of more consideration than it ordinarily receives. Breeders of pure bred hogs should be particularly careful to confine their selection of both boars and sows to the most popular and highly developed families, not forgetting, however, that individuality must accompany good breeding.

Securing the Best Results from Mating Hogs.—In addition to having good type the following suggestions are offered to insure good results from mating. Too often there are no definite plans in mating. The number of sows to be saved should be determined by the number of pigs it appears possible to feed and develop or dispose of to good advantage subsequent to farrowing time. Sows should be at least eight months old before being bred and many prefer to have them 10 to 12 months old. Conditions must be suitable for giving sows and little pigs comfortable quarters if the sows are to be bred early in the season. The gestation period of the sow is 112 days and one should have in mind and record the date of farrowing when the boar is



Removing the tusks from an old boar.—*Wisconsin College of Agriculture.*

turned with the sow. Having the sows of the herd all bred as closely together as possible will add to the convenience and to the profits of feeding and developing a uniform lot of pigs the following season. Sows bred in the fall should have been properly developed and in the case of sows having had one or more litters they should have been separated from their pigs sufficiently long and fed in a manner to be in good condition. It is reasonable to expect that a sow will breed more successfully when in good, thrifty condition than she will when in a rundown, weakened condition. Being in good condition at the time of mating will also tend to reduce the cost of wintering her. The sow should not be too fat, however, at mating time. At no time except for show purposes is it profitable to have the sow in more than good, smooth thrifty condition. Sows in too fat condition are likely to be shy breeders or to have difficulty at farrowing time. About twenty-one days after mating sows should be watched to note any return in heat that will occur at this time if sows have not been safely bred.

Handling the Boar at Mating Time.—A boar should not be put to service until he is at least eight months old and his service should be limited to 20 sows the first season. In doing this amount of service and in fact under any circumstances, he should have been grown well and be cared for during the mating season in a manner to insure a vigorous and thrifty condition. Until fully developed the young boar should be handled carefully, given plenty of exercise and fed a growing ration. A mature and proven boar is best to depend upon for securing the best litters and for that reason it is best to keep a boar as long as he can be kept without inbreeding and his service is satisfactory. The mature boar is best when kept on a maintenance ration of grass and a small amount of grain when necessary. A sufficient amount of grain to have the boar in good condition at and during the mating season will tend to insure best results. It is best to have a separate pen and yard for the boar and to turn the sows with him when they are to be bred, for the reason that a greater amount of service can be required of the boar, and feed and annoyance will be saved.

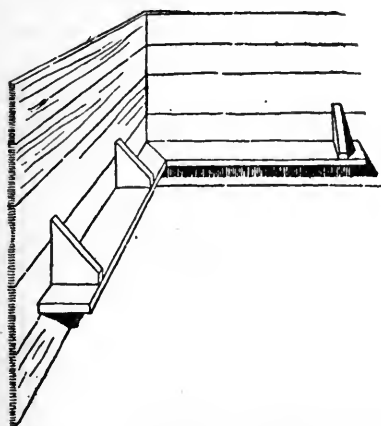
After a boar is a year old his tusks, four of which will have developed, should be removed and kept from getting long enough to do damage to his attendant and to other animals. Cutting them twice a year with a pair of pinchers after the manner shown in the accompanying illustration is the best practice to follow and is much more humane than breaking them out with a hammer and chisel. The mature boar will perhaps need to have his feet trimmed occasionally. They should not be allowed to become long or out of shape to the extent that the boar cannot handle himself well. The feet are best trimmed by throwing the boar and using a pair of pinchers and a rasp. The boar is the most important animal in the herd and can well be the best that money and good care will provide. He should furthermore be safeguarded against infectious and contagious diseases, kept free from lice and given the necessary attention to make him most serviceable. When his period of usefulness as a stock hog is over he should be castrated and fattened which as a general rule it is profitable to do.

The Care of Brood Sows.—A lack of exercise and a proper variety of feeds are undoubtedly the two greatest failures in the management of brood sows. An abundance of exercise is necessary for growing animals and brood sows and especially should this be kept in mind during the winter months when there is likely to be no inducement for hogs to get far away from their nest and feeding place. Pregnant sows should be encouraged or compelled to take exercise. Having them travel about and root for their feed by having the feeding place some distance from their sleeping quarters and more or less of the grain scattered in litter on a feeding floor, accomplishes the end of making them exercise.

The sleeping quarters should be kept clean and dry. Several sows kept together with a good nest will keep comfortably warm in winter which is a saving of feed, a kindness to animals and advantageous in other respects. Sows should be free from lice and treatment to rid them of lice during winter should be given before the weather becomes cold. Avoid entrances to pens or yards over which heavy pregnant sows have to drag their bellies over a sill or cross piece.

The Feeding of Pregnant Sows.—A variety of feeds should be supplied pregnant sows in quantities that enables the sows to gain or retain a thrifty condition. A ration of equal parts ground corn or barley, wheat middlings and wheat bran or alfalfa, fed as a thick slop, provides a good ration.

Feeding alfalfa hay in racks in the yard if it is not practical to grind it will answer very well. Ear or shelled corn scattered about and a thin slop of middlings in addition to alfalfa, clover, soy bean or pea vine hay, provide an excellent and economical ration. A few sugar beets or sugar mangels keep sows in a suitable laxative condition and take the place of bran that may be used in the ration.



**CORNER OF FARROWING
PEN EQUIPPED WITH FENDER**

The Sow at Farrowing Time.—Sows that farrow late in the season are often left to make their own nests and farrow without attention on the part of the owner. This does not insure the best results and a better plan is to have a clean, roomy pen in the hog house or a separate hog cot arranged and bedded properly for farrowing quarters. The sow should be put into the farrowing pen several days before she is due to farrow to become accustomed to the new quarters. The bedding should be fine, free from dust to prevent coughing and pneumonia, and supplied in amounts that the sow will make best use of in making her nest.

Careless or indifferent sows will be less likely to injure or kill their pigs if little bedding is used. The farrowing pen should be provided with a rail or

fender, as shown in the accompanying illustration, to protect the little pig as the sow lies down. If the weather is cold, precautions should be taken to protect the sow and little pigs from becoming chilled. A box with a lantern in the bottom and a basket suspended in the top in which the new born pigs can be put until they are dry and have nursed the mother, will be helpful when the weather is cold and quarters are not sufficiently warm. A hot bath may revive a chilled pig.

Having sows familiar with the attendant and accustomed to being handled and the attendant being on hand to see that the pigs are properly started in life, insures against losses that frequently occur.

During the first day after farrowing the sow should be as quiet as possible. Water with the chill removed should be offered her and only a small amount of laxative feed like a thick slop of bran supplied if she appears to be hungry. It is best to feed her sparingly for a few days to avoid milk fever and difficulty with the little pigs. After 24 hours the feed should be gradually increased until in two weeks time the sow is getting a liberal ration suitable for milk production which should be continued until the pigs are weaned.

Suitable Rations for Sows With Litters.—Rations for sows with litters after they have been gradually worked onto full feed, must be liberal and of a character to make lots of milk and keep the sow from losing flesh too rapidly. Sows that are good milkers will naturally lose weight during the time they are nursing their litters. Rich slop of skim milk, butter milk, wheat middlings, red dog flour, ground oats, peas, soy beans, cowpeas, tankage and oil meal in combination with corn meal, barley and other starchy feeds should be provided in quantities that the sow will clean up without waste twice or three times daily.

A mixture of equal amounts by weight of corn or corn meal, wheat middlings and finely ground oats and to every 100 pounds of this six to eight pounds of oil meal, fed with skim milk, suggests one combination for providing a suitable ration.

An abundance of good grass pasture or suitable forage will save much of the grain that otherwise will be necessary to feed and greatly increase the profits of hog raising. In fact hog raising on a large scale may be regarded unprofitable unless an abundance of pasture or forage or some comparatively inexpensive by-product can be utilized.

Salt and Correctives for Hogs.—Sows as well as growing and fattening pigs should have salt and correctives which are better supplied by keeping a suitable mixture in a covered trough or self-feeder where free access can be had to them, than trying to mix them with the feed. Charcoal is a most excellent corrective. Day recommends a mixture of ten parts wood ashes, one part salt and one part sulphur if charcoal is not available. Air slaked lime, ground lime stone, rock phosphate, bone meal, soft coal and copperas are other correctives used more or less in mixtures or placed in separate compartments of a self-feeder. During the summer when hogs have access to the earth and vegetable matter they have little need of correctives as a rule.

Difficulties at Farrowing Time.—Sows that eat their pigs at farrowing time do so because of a feverish condition and an abnormal appetite. Proper rations, access to correctives and abundant exercise are insurance against difficulties at farrowing time as a rule. Where sows show the abnormal appetite and desire to eat their pigs, it has been recommended that three pounds of salt pork be cut up and fed to the sow. Another recommendation is to sponge the pigs with mucilage containing equal parts of aloes and asafetida as soon as they are dry after birth. The offensive odor prevents the sows from touching the pigs in this instance.

When conditions are abnormal and the sow is unable to give birth to her pigs, it becomes necessary to remove them and this is done most satisfactorily by means of pig forceps which it is worth while to have in the list of useful instruments on the farm. A successful farmer and stockman states that in two instances where sows were found in a critical condition due to inability to give birth to their pigs, they succeeded in doing so and were saved by a method of treatment handed down to him by his father. The treatment was to give the sow access to a pool of water or to shower or drench her with cold water.

Care and Development of Pigs.—Up to the age of about four weeks little pigs derive all of their nourishment from the mother. To see that they are properly owned by their mother, exercised sufficiently to avoid getting the thumps and provided with a clean dry nest, is all that one can do for them up to this age. When they begin to eat at the trough with their mother they should be encouraged to eat from a small trough set in a pen or yard to which they can enter and the mother cannot. This insures faster growth and development and saves their drawing too heavily upon the mother. The same ration of skim milk and grain supplied to the mothers will be suitable.

Castration of Pigs.—The only excuse for delaying castration after pigs are six weeks old is in getting a development of pure bred pigs that will decide whether or not they will be saved for breeding purposes. For pork purposes, castration is best done when the pigs are small and can be easily handled. The operation is comparatively simple and anyone can perform it who has been instructed and once shown how. The principal precautions are as follows:

Do not defer the operation after six weeks unless for good reasons. The older the animal the greater the loss of blood and vitality and the longer it will take the pigs to recover.

Choose a cool day when pigs will not easily become over heated from the excitement. Avoid as much excitement as possible by having the pigs away from their mothers and older hogs.

Have a clean pen in which to perform the operation. After a rain when the yards and fields are clean and free from dust will be a time when the wounds will heal with the least chance for infection. Do not allow pigs to run to pools of stagnant or filthy water.

Hold the pig firmly and make the incisions large and low enough so that the wound will properly drain.

Prior to making the incision and before releasing the pig after the operation has been performed, sponge the scrotum and wound with a three percent solution of coal tar disinfectant.

Marking Pigs for Identification.—Pure bred pigs that are to be registered and sold for breeding purposes must be given some mark of identification in order that there may be no question with reference to their breeding and age. A system of marking widely used and recommended is herewith illustrated.

One notch in outer rim of right ear counts 1, in outer rim of left ear 3, in inner rim of right 10, and in inner rim of left 30. Combinations of these notches can easily be made to number up to 100, as shown in the Key. The three figures at the right of the Key show how the ears are marked for litters 5, 17, and 41. The litters each year should be numbered in the order of their birth, each pig of the litter given the same marking. Litter identification marks should always be entered in a record book.



One method of marking the Pigs with a punch or a like instrument made especially for that purpose.

This system is quite easy to learn and remember. Numbers 1 and 3 should be firmly fixed in mind, also 10 and 30. Thus No. 2 is simply two No. 1's; No. 4, a combination of 3 and 1, which makes four; No. 5, a combination of 3 and 2; No. 6 two 3's; No. 7 a combination of 6 and 1; No. 8 a combination of 6 and 2; and No. 9, three 3's. But few notches will be required to mark the number of any litter up to 100. By keeping note book and herd records of the litter markings, the date of farrowing and breeding of all animals can be tabulated and kept easily for reference.

Weaning and Growing Pigs.—If sows are required to raise only one litter a year, the pigs may be left with them and not weaned until three months old. If sows raise two litters a year the pigs should not nurse more than eight weeks. When pigs are weaned it is well to separate them into groups according to size. Not more than 20 pigs will feed to good advantage in the same lot. Good pasture of June grass, clover, alfalfa and forage crops like rape, peas and oats, should be available for growing pigs after they are weaned and during the season. In addition to pasture two pounds of concentrates and never less than 1 pound per 100 pounds of live weight should be fed. If available six pounds of skim milk or 12 pounds of whey may be regarded equivalent to 1 pound of the concentrates required. Pigs should gain and make a growth so that if desirable to finish them at 6 or 7 months they will weigh 200 pounds or more. The finishing period will need to be the last two months in this instance and corn, barley or other fattening concentrates fed in as large quantities as the pigs will consume. It pays to include with

these fattening feeds 10 per cent of high grade tankage or to feed more or less other nitrogenous feeds like red dog flour, wheat middlings and oil meal in addition to the highly carbonaceous feeds like corn or barley. Corn may be fed on the ear or shelled and there is little or no gain in grinding or soaking it. The exercise and feeding of coarse feeds should be reduced during the finishing period. If pigs are to be carried and finished at an older age they should be continued on pasture and a limited amount of grain until the finishing period is reached. Only under conditions where pasture is abundant and there is an opportunity to make an economical growth and to fatten hogs after steers or in a manner to make profitable gains, is it a good policy to produce heavy butcher hogs. The most economical gains are usually those made by pigs weighing under 250 pounds.

Fall pigs that do not get the benefit of pasture and forage should be provided with most suitable quarters and rations including dairy by-products, a good mixture of concentrates and during the growing period clover, alfalfa or other legume hay or chaff and roots. Finely cut legume hay mixed in the slop is excellent for growing pigs in winter.

Cooked potatoes mashed and mixed with meal can be fed to good advantage. Only in the instance of feeding potatoes does it pay to cook feed for hogs. Hot water to provide warm slop for pigs in winter will add to their growth and the economy of gains made.

Self-Feeders for Hogs.—Experiment Station trials on growing and fattening hogs with self-feeders and the experience of practical swine growers show that this method of feeding after weaning is well adapted to the quick growing and fattening of pigs. The method is also well adapted to fattening old sows or sows that are to be turned to the butcher soon after pigs are weaned. When it is the plan to grow pigs largely on pasture and not hurry the growth, the self-feeder should not be used. Judgment must be exercised in using self-feeders for pregnant sows. Bulky feed like cut legume hay will need to be supplied to prevent sows getting too much grain and becoming too fat. Corn and meat meal or tankage in separate compartments of the self-feeder with good alfalfa or rape pasture, and access to salt and plenty of pure, fresh water, provides a most economical system of producing pork. Evvard of the Iowa Station has also found that the self-feeder may be used to good advantage in dry lots for feeding shelled corn and tankage. Salt, ground limestone and charcoal were also furnished pigs in a self-feeder under dry lot conditions.

Water Essential to Hogs.—Dietrich, who is a good authority, concludes that a proper amount of water for pigs ranges from 12 pounds daily per 100 pounds of weight, from time of weaning down to four pounds per 100 pounds during the fattening period. It is his opinion that pigs do not drink water enough in winter and that they should be encouraged to drink more than they usually do by warming it and mixing more of it in their slop.

Feeding for Bacon.—Day, of the Ontario Agricultural College, is one of the best authorities on bacon production in America. The highest grade and quality of bacon requires that the fat should be clear white, the flesh firm

and the percentage of lean to fat much higher than in the carcass of the lard hog. While the breeding of the hog has much to do with the conformation, the feeding has much to do with the character of the meat. Fattening feeds like corn fed exclusively do not produce the right character of flesh for bacon. Oily carcasses, the result of feeding beans, more especially soy beans and peanuts are rejected altogether and carcasses which approach an oily condition produce bacon of low quality. Barley ranks first for producing a high grade of bacon, and is followed by oats and peas. Dairy by-products with cereal grains, including corn and a considerable variety of feeds, produces good results. Only where there is a premium paid for hogs most suitable for bacon can it be expected that farmers will study to produce and finish bacon hogs that will compare favorably with those that may be considered best for the purpose.

Denmark has a select bacon trade and excels in the production of the highest quality of bacon. The following is quoted relative to rations used by the Danes in the production of bacon:

"Ground barley, cooked potatoes, and skim milk; shorts and skim milk; 2 parts shorts, 2 parts ground barley, 1 part corn meal, and skim milk; 2 parts ground barley, 1 part wheat bran, 1 part ground rye, and skim milk; 2 parts ground barley, 1 part ground oats, 1 part corn meal, and skim milk. Corn meal is fed with care, especially during warm weather; when fed in small quantities with barley, shorts, oats, and bran, combined with a liberal allowance of skim milk, there are no bad results. Some good feeders use corn meal to the extent of one-third or one-half of the grain ration during the first three or four months and then omit it and finish with oats or similar feed. Feeders are sometimes compelled to use corn on account of the low price of bacon. Ground rye to the extent of about one-third of the ration gives good results, but rye shorts are not satisfactory and are only used in small quantities. The best feeds are ground barley, crushed oats, and wheat shorts. Roots are fed during winter and soiling crops during summer."

Marketing Hogs.—As with other classes of stock, the producer should study and keep posted on the market situation. The following market classification of hogs should be taken into consideration in deciding or anticipating about what a given lot of hogs are worth on the market. One should also be posted on other features of the market that influence prices and on freight, yardage and commission charges. This knowledge will be helpful in selling at home to drovers or shippers as well as in shipping a carload or more to a packing house center. Unless one has at least a carload or can combine with a neighbor to make a carload, it is best to sell at home or some nearby slaughtering plant where it will not be necessary to ship. Stock yard companies or live stock commission firms will be glad to furnish information on commission, yardage and feeding charges, dockage and rules relating to inspection, disposal of dead animals and methods of practice.

Shipping Hogs to Market.—The shrinkage on a carload of hogs weighing 15,000 to 17,000 pounds may be 1,000 pounds when conditions are wrong. The

MARKET CLASSES OF HOGS.

Classes	Sub-Classes	Grades
Prime heavy hogs, 350-500 lbs. ....	.....	Prime
Butcher hogs, 180-350 lbs.	Heavy butchers, 280-350 lbs.	Prime
	Medium butchers, 220-280 lbs.	Good
	Light butchers, 180-220 lbs.	Prime Good Common
Packing hogs, 200-500 lbs.	Heavy packing, 300-500 lbs.	Good
	Medium packing, 250-300 lbs.	Common
	Mixed packing, 200-280 lbs.	Inferior
Light hogs, 125-220 lbs.	Bacon. { English, 160-220 lbs.	Choice Light Fat
		Choice Good Common
	United States, 155-195 lbs.	Choice Good Common
		Choice Common Inferior
	Light mixed, 150-220 lbs.	Good Common Inferior
Pigs, 60-125 lbs.	Light mixed, 125-150 lbs.	Good Common Inferior
	.....	Choice Good Common
Roughs, stags, boars.	.....	.....
Miscellaneous.....	Roasting pigs, 15-30 lbs. Feeders Governments Pen-holders Dead Hogs	.....

shipper should aim to have as little shrinkage as possible and the following suggestions are offered on shipping to the best advantage.

Hogs ship better and fill better at the end of their destination if they are not fed just prior to being loaded. If they can be fed 12 hours after being on the road in the car at some stopping point, it will be profitable to the shipper to feed them. It is customary to feed and water as soon as they arrive at their destination and are unloaded.

Cars should be thoroughly cleaned and well bedded. A layer of clean straw covered with sand makes a turf-like bed on which hogs will lie down and ride comfortably and come out of at the market in a clean, strong condition that makes them sell well. Hogs that are uneasy and restless during shipment always shrink badly. The condition of the hogs upon arriving at the market makes more difference in the price received, than the commission firm which sells them and which is criticised not infrequently for not securing

a better price. It is well for the shipper to accompany his stock and observe under what conditions best results may be secured.

Growing, Developing and Marketing Pure Bred Hogs.—Pure bred hogs for breeding purposes may be fed and developed after the manner suggested for growing pigs from birth to the period when they are to be fattened. The character of stock developed plays the greater part in making pure bred stock breeding successful, and every effort should be made to have the stock to be offered in the most attractive condition without its being pampered. Only show animals are fattened to show all of their possibilities and the aim should be to have sale stock in a thrifty, well developed condition without being fattened but carrying an abundance of firm, natural flesh.

It is not always possible to tell just how a young pig will develop, but all individuals that are off type and color, or deficient in any manner should be separated from sale lots and only the best individuals retained. Boars and sows should be kept in separate lots and not too many pigs should run together in a given lot.

A complete record of the breeding and identity of individual pigs is absolutely necessary for success. A record book, as well as the certificates of registration, should be posted and will be found valuable to the extent that it contains a record and notes on all transactions. The secretary of the breed association who looks after the registration and interests of the breed in question will be able to furnish full information, forms for registering and transferring and suggestions on keeping complete records. Certificates of registry and transfer should be promptly furnished. Stock that has to be shipped should be crated and sent in as satisfactory a manner as possible. A pleased customer is one of the best means of advertising and the true stockman endeavors to work for the best interest of his customers.

Buildings and Equipment for Hogs.—Each farm is equipped with buildings peculiar to itself and the proprietor or manager. Good drainage and dryness are two important features of buildings and yards for pigs. Good ventilation, plenty of light, warmth in winter and a convenient arrangement of pens, feeding troughs, bins for feed and facilities for providing and heating water are desirable for a central hog barn. A damp, cold building is altogether unsatisfactory. The central hog house should, therefore, be constructed to admit the maximum amount of sunlight. What is termed the farmer's type of sunlight hog house, commonly recommended, may be regarded as the most approved type and admits the greatest amount of sunlight to all parts of the building.

Concrete floors and walls two feet above the floor are most sanitary and may be used, provided that wood overlays are used in the pens, for sleeping quarters. These overlays should be portable to enable pens to be thoroughly cleaned and disinfected.

For summer when hogs should be moved to pasture fields, the small colony house is highly desirable. The A-shaped house has the advantage of being easily constructed, inexpensive and readily moved from place to place. It should be located with reference to convenience and good drainage. The number of these

houses can be increased as the herd may increase and it is possible to arrange and bank them in a sheltered place to render them useful for providing winter quarters for sows, gilts and fattening hogs.

The accompanying illustration of the framework of an A-shaped, portable hog house and the following bill of lumber is necessary to construct the shed in complete form:

Nine pieces 1" x 12" x 16' and 11 O. G. battens 16' long for roof.

Three pieces 2" x 6" x 16' and 11 O. G. battens 16' long for roof.

Five pieces 1" x 12" x 14' for ends.

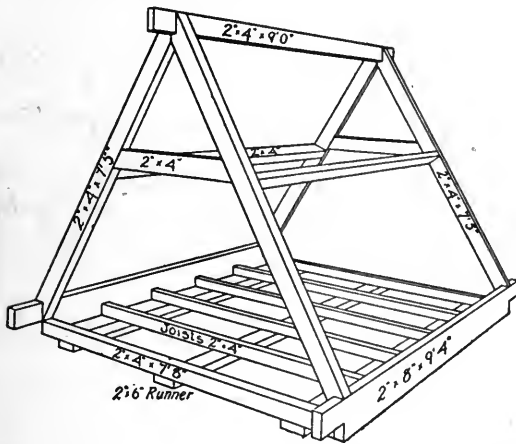
One piece 2" x 4" x 10' for ridge.

Two pieces 2" x 8" x 10' for plates.

Seven pieces 2" x 4" x 16' for rafters and braces in frame.

Three pieces 2" x 6" x 8' for runners.

Four pieces 1" x 12" x 16' rough for flooring.



Sanitation, Disinfection and Quarantine Measures.—

The hog is naturally not a filthy animal. One must exercise care, however, in keeping pens and yards in a clean, sanitary condition for otherwise filth rapidly accumulates and the environment becomes undesirable. Hogs that receive proper kinds and amounts of feed are least inclined to root up their yards. If the hog house and feeding yards have proper drainage it is not difficult to keep the hogs from wallowing in filthy pools. Pro-

viding concrete pools in which clean water and crude oil or disinfectants can be available for hogs, are desirable in many respects.

Disinfectants should be used freely. Five parts of creolin or crude carbolic acid in one hundred parts of water, chloride of lime, or proprietary disinfectants should be used to disinfect pens. Where a contagious disease has been present, floors, walls, all equipment and immediate yards should be scraped and disinfected. Larger paddocks and fields should be plowed where they become foul. It is a good plan to have a regular season for cleaning, whitewashing and putting building and yards in good repair and order.

Where animals are purchased or are returned from fairs and expositions, a rigid rule of keeping them quarantined and separate from the home herd for three weeks will guard against a general outbreak of disease. Any sick hog should be removed from the herd immediately and the disease carefully investigated to prevent a further spread of it. Hogs which die are best disposed of by burning the carcass. They at least should be buried deeply enough to prevent their being dug up by dogs or other animals.

DISEASES OF SWINE.

General Symptoms.

Appetite; loss of appetite; fever; thirst; much distress; dry mouth; diarrhea with a little blood; weakness; once in a while vomiting.—**Inflammation of the Bowels—Enteritis, Page 252.**

Appetite, loss of; udder tender and hard; fever; shrinkage in milk.—**Inflamed Udder, Page 259.**

Appetite poor (in sows); dullness; thirst; fever; much pain.—**Inflammation of the Womb, Page 259.**

Arched back; pains in the side; chills; fever; some coughing; uneasiness; fast breathing.—**Pleurisy, Page 265.**

Back arched; pains in the side; chills; fever; little coughing; uneasiness; fast breathing.—**Pleurisy, Page 265.**

Black teeth (veterinarians as a rule do not consider black teeth as a symptom of disease).

Blind.—Hog acts blind in last stages of the disease; poor appetite; rapid laborious breathing; delirium. (The hog runs about wildly, generally in a circle. He runs into things.) Symptoms in first stages of the disease: disinclination to move; acts stupid; bloodshot eyes; bowels constipated; pulse hard and quick.—**Epilepsy, Page 253.**

Blisters or tumors on the mouth or between the toes; fever; perhaps dullness.—**Aphthous Fever, Page 248.**

Bloating; little fever; ill smelling manure; passing of dry manure at first but later thin manure containing blood and mucus; uneasiness; poor appetite; dullness; some distress.—**Dysentery, Page 252.**

Bloating; much pain.—**Acute Indigestion, Page 248.**

Bloating, pain; chills; fever; quick breathing; tenderness of abdomen; vomiting and quickened pulse.—**Peritonitis, Page 264.**

Blood and mucus.—Passing of dry manure at first but later thin manure containing blood and mucus; uneasiness; poor appetite; dullness; some pain; fever and bloating; ill-smelling manure.—**Dysentery, Page 252.**

Bloating with pain and uneasiness coming on very suddenly sometimes; vomiting.—**Obstruction of the Bowels, Page 263.**

Blood.—Diarrhea with a little blood in the manure; weakness; dry mouth; loss of appetite; fever; thirst; much pain; sometimes vomiting.—**Inflammation of the Bowels or Enteritis, Page 252.**

Blood discharges from nose (in severe cases); discharges of mucus; snuffling.—**Snuffles, Page 267.**

Blood-shot, prominent eyes; hog stupid; restless; suddenly he may drop over as though hit with a sledge hammer and the limbs become straight and

stiff; he may seem dead but for his heavy breathing.—**Apoplexy**, Page 249.

Blood vomited out that is dark colored and contains particles of food; loss of appetite.—**Blood From Stomach**, Page 250.

Bowels.—Animal is found straining and unable to empty the bowels.—**Stricture of the Rectum or Large Bowel**, Page 263.

Bowels.—Either too loose or costive; craving for filthy food; loss of appetite; fits (in young pigs) fever; urine brown in color and scanty.—**Indigestion**, Page 259.

Bowels.—Extreme looseness of bowels without any disease.—**Diarrhea and Scours**, Page 252.

Bowels.—Soft tumors found near the outer opening of the large bowel.—**Piles**, Page 264.

Breathing difficult and quickened; hoarse cough; loss of appetite; discharge of mucus from the mouth (sometimes from the nose too) pushing head out; fever; weakness.—**Bronchitis**, Page 250.

Breathing difficult; sore and swollen glands under the throat; neck swollen; swallowing difficult; protruding of the tongue from the mouth covered with slaver.—**Quinsy**, Page 265.

Breathing—fast and laborious breathing; fever following a chill; loss of appetite; uneasiness; severe coughing; pain.—**Pneumonia or Lung Fever**, Page 265.

Breathing fast; back arched; pains in the side; chills; fever; some coughing; uneasiness.—**Pleurisy**, Page 265.

Breathing fast; bloating; pain; chills; fever; tenderness of abdomen; vomiting; quickened pulse.—**Peritonitis**, Page 264.

Breathing fast; dry, persistent, harsh cough, especially when exercised; continued falling away and weakness; diarrhea or constipation. (The symptoms of tuberculosis have no very decided characteristics. The tuberculin test is a surer way of determining the presence of the disease.)—**Tuberculosis**, Page 269.

Breathing hard and difficult in later stages of the disease; grating and gnashing of teeth; groaning; convulsions. First symptoms are: extremely painful swelling on the neck near the larynx. The hair on this swelling soon becomes bleached, stands on end and is brittle and hard.—**White Bristle**, Page 271.

Breathing rapid and laborious in last stages of the disease; poor appetite; delirium. (The hog runs about wildly, generally in a circle. He seems blind and runs into things.) In first stages the symptoms are: acts stupid; constipated bowels; pulse hard and quick.—**Epilepsy**, Page 253.

Bunch—puffy soft bunch at the navel which can be pressed back through the opening into the body.—**Navel Hernia or Rupture**, Page 263.

Cancerous condition of sow's tail developed during pigging time.—**Cancer of the Tail**, Page 250.

Cheeks, lips and tongue are covered with pimples that are yellowish-white and full of pus following a slaving at the mouth; gnashing of teeth, dis-

tressful and staring expression of the eyes, poor appetite and some fever. These pimples soon change to brown and then to black.—**Gum Mouth, Page 254.**

Chill followed by fever; accelerated and laborious respiration; loss of appetite; uneasiness; severe coughing; and pain.—**Pneumonia or Lung Fever, Page 265.**

Chills and pain in the side; fever; little coughing; uneasiness; fast breathing; the back is arched.—**Pleurisy, Page 265.**

Chills; bloating; pain; fever; quick breathing; tenderness of abdomen; vomiting; quickened pulse.—**Peritonitis, Page 264.**

Chills followed by feverish heat in rapid succession; gait swaggering and unsteady; very red mucous membrane; vomiting a discolored or bloody fluid; convulsions.—**Apoplectic Anthrax, Page 249.**

Circle.—Hog running in a circle; running into objects; frothing at the mouth; rapid laborious breathing; hog acts stupid; falling over and straightening out legs.—**Blind Staggers, Page 249.**

Cold extremities; head held down and mouth open; great distress; weak pulse; pig cannot stand; blood running from the nose in some cases.—**Pneumonia or Lung Fever, Page 265.**

Constipation; dullness; yellowish mucous membranes; some cough; generally comes on during hot weather.—**Liver Disease, Page 260.**

Cough.—Dry, persistent, harsh cough; rapid breathing, especially when exercised; continued falling away and weakness; diarrhea or constipation. (The symptoms of tuberculosis have no very decided characteristics. The tuberculin test is a surer way of determining the presence of the disease.)—**Tuberculosis, Page 269.**

Coughing; discharge of mucus from the nose; heaving at the flanks; loss of appetite.—**Colds, Page 251.**

Coughing, especially in the morning when the pig comes from his bed; jerking of the body; palpitation of the heart.—**Thumps, Page 268.**

Coughing frequently with no mucus discharge and no apparent inflammation of the mucous membranes.—**Colds, Page 251.**

Cough hoarse; loss of appetite, discharge of mucus from the mouth (sometimes from nose too) quickened difficult breathing; pushing head out; fever; weakness.—**Bronchitis, Page 250.**

Coughing; rash breaking out on fourth day; some sneezing; sore throat; inflamed eyes; fever; swollen eyelids; fast breathing.—**Measles, Page 261.**

Coughing; severe coughing; pain; fast and laborious breathing; first a chill and then fever; loss of appetite; uneasiness.—**Pneumonia, Page 265.**

Coughing spasmodically; swallowing with difficulty; skin hot and dry; throat inclined to fill up.—**Sore Throat, Page 268.**

Coughing when suddenly aroused; sluggishness, disinclination to move when disturbed; loss of appetite and flesh; growing so weak they walk with an uncertain gait; sometimes staggering; hind legs particularly weak; eyes inflamed and lids gummed together; profuse diarrhea; sick for several months.—**Hog Cholera, (chronic form) Page 254.**

- Diarrhea, bad form of; gait uncertain; sometimes staggering; coughing when suddenly aroused; sluggishness; disinclination to move when disturbed; loss of appetite and flesh; hind legs particularly weak; eyes inflamed and lids gummed together; sick for several months.—**Hog Cholera (chronic form.)** Page 254.
- Discharge from nose; nose is inflamed and the inflammation steadily increases; membrane of the nose swollen and dry; sneezing.—**Nasal Catarrh**, Page 262.
- Dropping over as though hit with a sledge hammer and the limbs becoming straight and stiff following a stupid and restless condition of the hog; eyes prominent and blood-shot; he may seem dead but for his heavy breathing.—**Apoplexy**, Page 249.
- Dry manure.—Passing of dry manure at first but later thin excrement containing blood and mucus; uneasiness; poor appetite; dullness; some pain; a little fever and bloating; ill smelling manure.—**Dysentery**, Page 252.
- Dullness; constipation; yellowish mucous membranes; some cough; generally comes on during hot weather.—**Liver Disease**, Page 260.
- Dullness; (in sows); poor appetite; thirst; fever; much pain.—**Inflammation of the Womb**, Page 259.
- Dullness; languor; indisposition to move; lameness in one or more limbs; swelling, heat or tenderness of a tendon, joint or bunch of muscles.—**Rheumatism**, Page 266.
- Eating enormous quantities of food; eating filthy food.—**Morbid Appetite**, Page 262.
- Eating.—Pig eats a plenty but does not gain as he should. He may even fall away.—**Stunted**, Page 268.
- Eyeballs inflamed, tears falling over the cheeks.—**Inflammation of the Eyes**, Page 259.
- Eye.—Enlarging of the pupil.—**Paralysis of the Retina**, Page 264.
- Eye-lids swollen; eyes inflamed; sore throat; coughing; rash breaking out on fourth day; some sneezing; fever; fast breathing.—**Measles**, Page 261.
- Eyes blood shot in first stages of the disease; hog is not inclined to move; acts stupid, bowels constipated; pulse hard and quick. Later symptoms: poor appetite; rapid laborious breathing; delirium. (The hog runs about wildly generally in a circle. He seems blind and runs into things.) **Epilepsy**, Page 253.
- Eyes have a distressful and staring expression; poor appetite; some fever; restlessness; slavering; gnashing of teeth. Later yellowish-white pimples that are full of pus come on the cheeks, lips and tongue. These pimples though yellowish-white at first soon change to brown and then to black.—**Gum Mouth**, Page 254.
- Eyes inflamed and lids gummed; spots of red or purple in color on the skin especially on the abdomen, inside the legs and around the neck and ears; blood stained spots on snout; snout dry; disinclined to move about; poor appetite; weakness; shivering; high fever; hiding under litter;

weakness of hind limbs at first and then of front limbs; intense thirst; bowels tight at first but later loose and offensive; tender abdomen; many hogs dying within a few days.—**Hog Cholera (Acute), Page 254.**

Eyes inflamed and lids gummed together; gait uncertain; sometimes staggering; coughing when suddenly aroused; sluggishness; disinclination to move when disturbed; loss of appetite and flesh; hind legs particularly weak; profuse diarrhea; sick for several months.—**Hog Cholera (Chronic form), Page 254.**

Eyes inflamed; sore throat; coughing; rash breaking out on the fourth day; some sneezing; sore throat; fever; swollen eye lids; fast breathing.—**Measles, Page 261.**

Eyes prominent and blood-shot; hog stupid; restless; suddenly he may drop over as though hit with a sledge hammer and the limbs become straightened and stiff; he may seem dead but for his heavy breathing.—**Apoplexy, Page 249.**

Falling away of flesh, weakness; diarrhea or constipation; dry, persistent, harsh cough; rapid breathing especially when exercised. (The symptoms of tuberculosis have no very decided characteristics. The tuberculin test is a surer way of determining the disease.)—**Tuberculosis, Page, 269.**

Falling over and straightening out legs; hog acts stupid; running in a circle; frothing at the mouth; rapid, laborious breathing.—**Blind Stagers, Page, 249.**

Fever (in sows); loss of appetite; udder tender and hard; shrinkage in milk.—**Inflamed Udder, Page 259.**

Fever (in sows); severe pain; thirst; loss of appetite; dullness.—**Inflammation of the Womb, Page 259.**

Fever; vomiting; stiffness; dullness; fast pulse; poor appetite; thirst; stupor; men; quickened pulse.—**Peritonitis, Page 264.**

Fever; vomiting; stiffness; dullness; fast pulse; poor appetite; thirst stupor; delirium.—**Scarlet Fever, Page 267.**

Fits (in young pigs); some fever; urine brown in color and scanty; bowels either too loose or costive; craving for filthy food; loss of appetite.—**Indigestion, Page 259.**

Flanks heaving; discharges of mucus from the nose; coughing; loss of appetite.—**Colds, Page 251.**

Flesh; continual falling away of flesh and weakness; fast breathing; dry, persistent, harsh cough, especially when exercised; diarrhea or constipation. The symptoms of tuberculosis have no very decided characteristics. The tuberculin test is a surer way of determining the presence of the disease.)—**Tuberculosis, Page 269.**

Food.—Craving for filthy food; loss of appetite; bowels either too loose or costive; fits (in young pigs); fever; urine brown in color and scanty.—**Indigestion, Page 259.**

Food.—Eating enormous quantities of food; eating filthy food.—**Morbid Appetite, Page 262.**

Food refused; gait unsteady; weakness; dullness; rooting in bedding; burying head or whole body in the litter; lying down more than usual; chills alternating with fever in quick succession; fast pulse; constipated bowels; manure dark colored and hard; red spots on inside of legs; on abdomen, breast and neck; these spots soon turn to erysipelatous swellings; small pustules on parts of swollen surface; increasing fever; in last stages hind quarters are paralyzed and convulsions set in.—**Erysipelas, Page 253.**

Fore feet far in advance of the body when walking; continually shifting the weight from one foot to another.—**Founder or Sore Feet, Page 267.**

Gait uncertain; sometimes staggering; coughing when suddenly aroused; sluggishness, disinclination to move when disturbed; loss of appetite and flesh; hind legs particularly weak; eyes inflamed and lids gummed together; profuse diarrhea; sick for months.—**Hog Cholera (chronic form), Page 254.**

Gait unsteady; refusal of food; weakness; dullness; rooting in bedding; burying head or whole body in straw; lying down more than usual; chills alternating with fever in quick succession; fast pulse; constipated bowels; manure dark colored and hard; red spots on inside of legs; on abdomen, breast and neck; these spots soon turn to erysipelatous swellings; small pustules on parts of swollen surface increasing fever; mucous membrane is purple or lead-gray in color; labored breathing; later the hind quarters of the hog are paralyzed; convulsions set in, and death results if the disease is allowed to run this far.—**Erysipelas, Page 253.**

Hair dropping from the skin in ring-like patches, the center of these patches becoming dry and the edges moist.—**Ringworm, Page 266.**

Head.—Bending of head; shaking and trembling of body; unthrifty condition. The pig soon gets stiff and tumbles over, struggling a short time. After lying quiet for a short time he gets up and acts perfectly well until another sick spell overtakes him.—**Fits in Pigs, Page 254.**

Head held low down and mouth open; great distress; weak pulse; cold extremities; pig cannot stand; blood running from nose in some cases.—**Pneumonia or Lung Fever, Page 265.**

Head.—Moving head from side to side; hog sits on haunches; changes position frequently; grunts; squeals; and sometimes bloats.—**Colic, Page 251.**

Head.—Pushing head out; fever; weakness; breathing difficult and quickened; hoarse cough; loss of appetite; discharge of mucus from the mouth (sometimes from the nose).—**Bronchitis, Page 250.**

Itching severely; large sores caused from rubbing; scabs on the skin.—**Mange, Page 261.**

Inflamed eyeballs; tears falling over the cheeks.—**Inflammation of the Eyes, Page 259.**

Jerking of body; coughing, especially in the morning when the pig comes from his bed; palpitation of the heart.—**Thumps, Page 268.**

- Lameness in one or more limbs; swelling, heat or tenderness of a tendon, joint or bunch of muscles; indisposition to move; languor; dullness.—**Rheumatism, Page 266.**
- Lice on animal.—**Lice, Page 260.**
- Manure clay colored; yellow appearing pig; poor appetite; dullness; constipation; vomiting; digestion out of order.—**Yellows, Page 272.**
- Manure.—Diarrhea with a little blood in the manure; weakness; dry mouth; loss of appetite; fever; thirst; much pain; sometimes vomiting.—**Inflammation of the Bowels or Enteritis, Page 252.**
- Manure.—Ill smelling; a little fever and bloating; passing of dry manure at first but later thin manure containing blood and mucus; uneasiness; poor appetite; dullness; some pain.—**Dysentery, Page 252.**
- Manure passed in dry, compact, ball-like masses.—**Constipation, Page 251.**
- Manure.—Yellow thin manure, much distress.—**Diarrhea and Scours, Page 252.**
- Milk.—Shrinkage in milk; udder tender and hard; loss of appetite; fever.—**Inflamed Udder, Page 259.**
- Mouth covered with blisters or tumors; blisters may also come between the toes; fever; perhaps dullness.—**Aphthous Fever, Page 248.**
- Mouth dry; loss of appetite; fever; thirst; much distress; diarrhea with a little blood; weakness; sometimes vomiting.—**Inflammation of the Bowels or Enteritis, Page 252.**
- Mouth.—Frothing at the mouth; rapid laborious breathing; hog acts stupid; running into objects, running in a circle; falling over and straightening out legs.—**Blind Staggers, Page 249.**
- Mouth open; head held down; great distress; weak pulse; cold extremities; pig cannot stand; blood running from nose in some cases.—**Pneumonia or Lung Fever, Page 265.**
- Movements of the muscles on various parts of the body are involuntary and convulsive although they seem to be voluntary unless noticed carefully.—**Chorea.**
- Moving.—Hog is not inclined to move in first stages of the disease; acts stupid; blood-shot eyes; constipated bowels; hard and quick pulse. Later symptoms; poor appetite; rapid laborious breathing; delirium. (The hog runs about wildly generally in a circle. He seems blind and runs into things.)—**Epilepsy, Page 253.**
- Mucus coming from nose; coughing; heaving of the flanks; loss of appetite.—**Colds, Page 251.**
- Mucus discharged from the nose, also blood in severe cases; snuffing.—**Snuffles, Page 267.**
- Mucus.—Discharge of mucus from the mouth; loss of appetite; hoarse cough; quickened difficult breathing; pushing head out; fever; weakness.—**Bronchitis, Page 250.**

Muscles on various parts of the body move involuntarily and convulsively.

The contractions are lax and irregular and seem to be voluntary.—**Chorea.**

Navel.—Puffy soft bunch at the navel which can be pressed back through the opening into the body.—**Navel Hernia or Rupture, Page 263.**

Neck swollen; glands under the throat are sore and swollen; breathing and swallowing difficult; protruding of tongue from mouth covered with slaver.—**Quinsy, Page 265.**

Nose.—Discharges of mucus from the nose; coughing; heaving at the flanks; loss of appetite.—**Colds, Page 251.**

Nose.—Discharges of mucus from the nose; discharges of blood in severe cases; snuffling.—**Snuffles, Page 267.**

Nose.—Membrane of the nose swollen and dry; sneezing; loss of appetite; discharge from nose; the nose is inflamed and the inflammation steadily increases.—**Nasal Catarrh, Page 262.**

Pain.—Much pain and bloating.—**Acute Indigestion, Page 248.**

Pain and uneasiness coming on very suddenly sometimes; some bloating; vomiting.—**Obstruction of the Bowels, Page 263.**

Pain; scratching of nose and hind parts; rooting; looseness or costiveness of bowels; sometimes a little blood and mucus in the manure; enormous appetite with little improvement in flesh; uneasiness.—**Worms, Page 271.**

Pains.—Severe pain (in sows); thirst; poor appetite; dullness, fever.—**Inflammation of the Womb, Page 259.**

Pains in the side; chills; fever; little coughing; uneasiness; fast breathing; the back is arched.—**Pleurisy, Page 265.**

Paralyzed; cannot move about.—**Paralysis, Page 263.**

Passing of dry manure in compact, ball-like masses.—**Constipation, Page 251.**

Pimples appearing on skin from which liquid oozes; fluid hardens and comes off giving the skin a scaly appearance.—**Scaly Skin Disease, Page 266.**

Pimples that are yellowish-white and full of pus come on the cheeks, lips and tongue following a slavering at the mouth, gnashing of teeth; distressful and staring expression of the eyes; poor appetite and some fever. These pimples soon change to brown and then to black.—**Gum Mouth, Page 254.**

Position.—Changing position frequently; hog moves his head from side to side; sits on haunches; grunts; squeals; sometimes bloats.—**Colic, Page 251.**

Pulse weak; head held down and mouth open; cold extremities; pig cannot stand; blood running from nose in some cases.—**Pneumonia or Lung Fever, Page 265.**

Pupil of the eye enlarged.—**Paralysis of the Retina, Page 264.**

Rash breaking out on fourth day; coughing; little sneezing; sore throat; inflamed eyes; fever; swollen eyelids; fast breathing.—**Measles, Page 261.**

Rectum.—Turning out of the rectum.—**Eversion of the Rectum, Page 254.**

Ring-like patches of hair dropping from the skin, the center of these patches becoming dry and the edges moist.—**Ringworm, Page 266.**

Rooting; looseness or costiveness of bowels; sometimes a little blood and mucus in the manure; enormous appetite with little improvement in flesh; uneasiness; pain; scratching of nose and hind parts.—**Worms, Page 271.**

Running about wildly in last stages of the disease; generally running in a circle; running into objects; rapid laborious breathing; poor appetite. In first stages the symptoms are: blood-shot eyes; disinclination to move; acts stupid; bowels constipated; pulse hard and quick.—**Epilepsy, Page 253.**

Running into objects; hog acts stupid; running in a circle; falling over and straightening out legs; frothing at the mouth; rapid laborious breathing.—**Blind Staggers, Page 249.**

Sack.—Testicle sack is greatly enlarged and feels dough-like and soft to the touch.—**Scrotal Hernia or Rupture.**

Scaly appearance of skin; pimples appearing on the skin from which fluid oozes; fluid hardens and comes off giving the skin a scaly appearance.—**Scaly Skin Disease, Page 266.**

Scratching of nose and hind parts; rooting; looseness or costiveness of bowels; sometimes a little blood and mucus in the manure; enormous appetite; with little improvement in flesh; uneasiness; pain.—**Worms, Page 271.**

Shaking and trembling and bending of head following an unthrifty condition. The pig soon gets stiff and tumbles over, struggling a short time. After lying quiet for a little while he gets up and acts perfectly well until another sick spell overtakes him.—**Fits in Pigs, Page 254.**

Shifting the weight from one foot to another continually; walking with fore-foot far in advance of the body.—**Founder or Sore Feet, Page 267.**

Shivering; hiding under the litter; disinclined to move about; loss of appetite; sluggishness; weakness; high fever; lying on belly; weakness of hind limbs at first and later of front limbs; inflamed eyes and gummed lids; red or purplish blotches on the skin, especially on the abdomen, inside the legs and around the neck and ears; rapid, weak pulse; dry snout covered with blood-stained spots; intense thirst; bowels tight at first but later loose and offensive; tender abdomen; often a hard cough; many hogs dying within a few days.—**Hog Cholera (acute), Page 254.**

Sitting on haunches; hog moves head from side to side; changes position frequently; grunts; squeals; sometimes bloats.—**Colic, Page 251.**

Skin.—Hair dropping from the skin in ring-like patches; the center of these patches becoming dry and the edges moist.—**Ringworm, Page 266.**

Skin hot and dry; throat inclined to fill up; spasmodic coughing; difficulty in swallowing dry feed.—**Sore Throat, Page 268.**

Skin.—Pimples appearing on the skin from which fluid oozes; fluid hardens and comes off giving the skin a scaly appearance.—**Scaly Skin Disease, Page 266.**

Slaver covering tongue when it protrudes from the mouth; soreness and swelling of glands under the throat followed by difficult swallowing and breathing; neck swollen.—**Quinsy, Page 265.**

Slavering; gnashing of teeth; eyes have a distressful and staring expression; poor appetite; some fever. Later yellowish-white pimples that are full of pus come on the cheeks, lips and tongue. These pimples though yellowish-white at first, soon change to brown and then to black.—**Gum Mouth, Page 254.**

Sluggishness: disinclination to move when disturbed; coughing when suddenly aroused; loss of appetite and flesh; growing so weak they walk with an uncertain gait, sometimes staggering; hind legs particularly weak; eyes inflamed and lids gummed together; profuse diarrhea; sick for several months.—**Hog Cholera (chronic form), Page 254.**

Sneezing; membrane of the nose swollen and dry; loss of appetite; discharge from nose; the nose is inflamed and the inflammation steadily increases.—**Nasal Catarrh, Page 262.**

Snuffling; discharge of mucus from the nose and discharges of blood in severe cases.—**Snuffles, Page 267.**

Sores back of pig's ears.—**Sorehead, Page 268.**

Soreness of sow's tail due to sort of cancerous condition developed during pigging time.—**Cancer of the Tail, Page 250.**

Sores.—Large sores on the skin caused by rubbing; severe itching; scabs on the skin.—**Mange, Page 261.**

Spots of red or purple color on the skin, especially on the abdomen, inside the legs and around the neck and ears; blood-stained spots on snout; dry snout; disinclined to move about; poor appetite; weakness; shivering; fever; hiding under litter; weakness of hind limbs at first and then of fore limbs; inflamed eyes and gummed lids; intense thirst; bowels tight at first but later loose and offensive; tender abdomen; many hogs dying within a few days.—**Hog Cholera (acute), Page 254.**

Spots red in color on inside of legs, on abdomen, breast and neck; these spots soon turn to erysipelatous swellings; refusal of food; gait unsteady; dullness; burying head or whole body in litter; lying down more than usual; chills alternating with fever in quick succession; fast pulse; constipated bowels; manure dark colored and hard; dullness; increasing fever; in last stages hind quarters are paralyzed and convulsions set in.—**Erysipelas, Page 253.**

Stiffness and tumbling over following a shaking and trembling and bending of the head. The pig remains quiet for a short time and then gets up and acts perfectly well until another sick spell overtakes him.—**Fits in pigs, Page 254.**

Stiffness, dullness; fever; fast pulse; poor appetite; thirst; stupor; vomiting; delirium.—**Scarlet Fever, Page 267.**

Straining and unable to empty the bowels.—**Stricture of the Rectum, Page 263.**

Straining and vomiting; extreme looseness of bowels.—**Diarrhea and Scours, Page 252.**

Straw.—Hiding under litter; disinclined to move about; loss of appetite; sluggishness; weakness; shivering; high fever; lying on belly; weakness of hind limbs at first and later of front limbs; inflamed eyes and gummed lids; red or purplish blotches on the skin; especially on the abdomen, inside the legs and around the neck and ears; rapid weak pulse; dry snout covered with blood-stained spots; intense thirst; bowels tight at first but later loose and offensive; tender abdomen; often a hard cough, dying within a few days.—**Hog Cholera (acute), Page 254.**

Stupid actions of hog; running into objects; running in a circle; falling over and straightening out legs; frothing at the mouth; rapid laborious breathing.—**Blind Staggers, Page 249.**

Stupid, restless; the eyes are prominent and blood-shot; suddenly the hog may drop as though hit with a sledge hammer and the limbs become straightened and stiff; he may seem dead but for his heavy breathing.—**Apoplexy, Page 249.**

Swaggering and unsteady gait; much pain; temperature changing from feverish heat to cold chills in rapid succession; very red mucous membrane; vomiting a discolored or bloody fluid; convulsions.—**Apoplectic Anthrax, Page 249.**

Swallowing is difficult when eating dry feed; spasmodic coughing; throat inclined to fill up; dry and hot skin.—**Sore Throat, Page 268.**

Swallowing with difficulty; skin hot and dry; throat inclined to fill up; spasmodic coughing.—**Sore Throat, Page 268.**

Swelling, heat or tenderness of a tendon, joint or bunch of muscles; indisposition to move; langour; dullness; lameness in one or more limbs.—**Rheumatism, Page 266.**

Swelling on the neck near the larynx that is extremely painful. The hair on this swelling is soon bleached and stands on end. It is brittle and hard. In the later stages of the disease the following symptoms are prominent: grating and gnashing of teeth; laborious breathing; groaning, convulsions. The diseased hog dies within a few days.—**White Bristle, Page 271.**

Swelling on throat that is painful, hot and hard; there is wheezing; laborious breathing; swollen tongue; hoarse grunting; dry snout; brownish-red color of the mucous membrane of the mouth; attempts to vomit; difficulty in swallowing food; high fever. (This disease usually comes as an epidemic and spreads over a large territory).—**Malignant Angina, Page 260.**

Swollen testicle sack that feels dough-like and soft to the touch.—**Scrotal Hernia or Rupture, Page 263.**

Tears falling over cheeks; inflamed eyeballs.—**Inflammation of the Eyes, Page 259.**

Teeth.—Grating and gnashing of teeth following a swelling on the neck near the larynx that is extremely painful. (The hair on this swelling soon be-

comes bleached, stands on end, and is brittle and hard); groaning; convulsions. The diseased hogs die within a few days.—**White Bristle, Page 271.**

Testicle sack is greatly enlarged and feels dough-like and soft to the touch.—**Scrotal Hernia.**

Thirst (in sows); poor appetite; dullness; fever; much pain.—**Inflammation of the Womb, Page 259.**

Thirst intense; inflamed eyes and gummed lids; bowels tight at first but later loose and offensive; tender abdomen; many hogs dying within a few days; red or purple spots on the skin, especially on the abdomen, inside the legs and around the neck and ears; blood-stained spots on the snout; snout dry; disinclined to move about; poor appetite; weakness; shivering; high fever; hiding under litter; weakness of hind limbs at first and then of fore limbs.—**Hog Cholera (acute), Page 254.**

Throat has a swelling on it that is painful, hot and hard; there is wheezing; laborious breathing; swollen tongue; hoarse grunting; dry snout; brownish-red color of the mucous membrane of the mouth; attempts to vomit; difficulty in swallowing food; high fever. (This disease usually comes as an epidemic and spreads over a large territory.)—**Malignant Angina, Page 260.**

Throat inclined to fill up; dry and hot skin; difficulty in swallowing; dry feed; spasmodic coughing.—**Sore Throat, Page 268.**

Throat sore; coughing; rash breaking out on fourth day; some sneezing; inflamed eyes; fever; swollen eye lids; fast breathing.—**Measles, Page 261**

Throat.—Soreness and swelling of glands under the throat followed by difficult swallowing and breathing; swelling of neck; protruding of tongue from mouth covered with slaver.—**Quinsy, Page 265.**

Toes have blisters or tumors between them; the mouth is also blistered; fever; perhaps dullness.—**Aphthous Fever, Page 248.**

Tongue protruding from mouth covered with slaver; soreness and swelling of glands under the throat followed by difficult swallowing and breathing; swelling of neck.—**Quinsy, Page 265.**

Tongue swollen; wheezing; laborious breathing; hoarse grunting; dryness of snout; brownish-red color of the mucous membranes of the mouth; trying to vomit; difficulty in swallowing food; swelling on the throat that is painful, hot and hard; high fever. (This disease usually comes as an epidemic and spreads over a large territory.)—**Malignant Angina, Page 260**

Trembling and shaking; bending of head; unthrifty condition. The pig soon gets stiff and tumbles over, struggling a short time. After lying quiet for a little while he gets up and acts perfectly well until another sick spell overtakes him.—**Fits in Pigs, Page 254.**

Tumors.—Soft tumors found near the outer opening of the large bowel that bleed very easily. In case they do not bleed they are called blind piles.—**Piles, Page 264.**

- Turning out of the rectum.—**Eversion of the Rectum, Page 254.**
- Udder tender and hard; loss of appetite; fever; shrinkage in milk.—**Inflamed Udder, Page 259.**
- Urine brown in color and scanty; bowels either too loose or costive; craving for filthy food; loss of appetite; fits (in young pigs); fever.—**Indigestion, Page 259.**
- Vomiting a discolored or bloody fluid; convulsions; swaggering and unsteady gait; much pain; temperature changing from feverish heat to cold chills in rapid succession; very red mucous membrane.—**Apoplectic Anthrax, Page 249.**
- Vomiting and straining; extreme looseness of bowels.—**Diarrhea and Scours, Page 252.**
- Vomiting; chills; bloating; pain; fever; quick breathing; tenderness of abdomen; quickened pulse.—**Peritonitis, Page 264.**
- Vomiting dark colored blood containing particles of food; loss of appetite.—**Blood from Stomach, Page 250.**
- Vomiting; manure clay colored; yellow appearing pig; poor appetite; dullness; constipation; digestion out of order.—**Yellows, Page 272.**
- Vomiting; severe distress and uneasiness coming on very suddenly sometimes; some bloating.—**Obstruction of the Bowels, Page 263.**
- Vomiting; stiffness; dullness; fever; fast pulse; poor appetite; thirst; stupor; delirium.—**Scarlet Fever, Page 267.**
- Vomiting.—**Vomiting, Page 271.**
- Walking with forefeet far in advance of the body Continually shifting the weight from one foot to another.—**Founder or Sore Feet, Page 267.**
- Weakness; continual falling away of flesh; diarrhea or constipation; dry, persistent, harsh cough; rapid breathing, especially when exercised. (The symptoms of tuberculosis have no very decided characteristics. The tuberculin test is a surer way of determining the presence of the disease).—**Tuberculosis, Page 269.**
- Wheezing; laborious breathing; swelling of tongue; hoarse grunting; dryness of snout; brownish-red color of the mucous membranes of the mouth; trying to vomit; difficulty in swallowing food; swelling on the throat that is painful, hot and hard; high fever. This disease generally appears as an epidemic, spreading over a large territory).—**Malignant Angina, Page 260.**
- Yellow appearance of pig; poor appetite; dullness; constipation; clay colored manure; vomiting; digestion out of order.—**Yellows, Page 272.**
- Yellowish mucous membranes; constipation; dullness; some cough; generally comes on in hot weather.—**Liver Disease, Page 260.**
- Yellow thin manure; much pain.—**Diarrhea and Scours, Page 252.**

TREATMENT FOR DISEASES OF SWINE.

Castration.

This consists in the removal of the sex organs of the male pigs.

Castrating Pigs.—Boar pigs should be castrated when they are from two to eight weeks old so that they may recover before weaning time. The earlier a pig is castrated the easier it seems to be for him. A young pig can easily be castrated by one person if no help is at hand. To do this stand the pig on his head in a nail keg or something of a like shape to prevent his troublesome resistance. If help is at hand the assistant may hold the pig in position. It is usually better to have a carbolic acid solution (1 part to 50 of water) at hand in which to dip the knife and hands and wash off the parts. Many pigs come through an operation when no disinfectant is used but of course there is danger in the practice. To remove the testicles place the left hand under the sack and make a bold incision large enough for the testicles to escape. Separate the testicles from the covering and tie a piece of linen thread around the cord to prevent bleeding. Cut the cord just above the thread. If the thread does not fall off it can be pulled off in a few days. If flies are troublesome it is a good plan to pour some coal oil into and over the wound.

Castrating a Boar.—A boar may be castrated at almost any convenient time. The operation is performed the same as for pigs unless he is ruptured. If this is the case the hind quarters should be elevated a few inches. The sack should be washed, then an incision made to, but not through the last covering of the testicles. This should be taken out with the testicles by separating it from the outer covering, forcing the testicles out, tying a string around the cord about three inches above the testicles, and cutting off the cord. Be sure the string is tight enough to keep the bowels from slipping out. If maggots develop in a wound apply buttermilk or turpentine.

Castrating a Ridgling.—In a ridgling the testicles are not in their proper place but are in the body of the animal, just behind the kidneys. To remove them cut him in the side about midway up and down and a little back of the last rib. Make an incision large enough to admit the whole hand. Through this opening the seeds can be easily found and pulled out.

Giving a Hog Medicine.

In drenching a hog you will find it much handier to use a rubber hose instead of a bottle as the hog may break the latter. The hose is run into the back part of the mouth and the medicine poured through it.—Recommended by Will Saunders, DeWitt, Ia., Route 1.

To drench a hog cut the toe from an old shoe, put the shoe into the back part of the mouth and pour the medicine in at the top. I have found this very handy.—Will Saunders, DeWitt, Ia., Route 1.

Conditioners for Hogs.

Keep a mixture of equal parts of air slaked-lime and salt before the hogs. This will help keep them in good health. Put this in a box where they cannot get on to it with their feet.

Charcoal is fine for keeping the hogs in good health if kept before them continually. (Good charcoal can be made by burning corn cobs to a red hot mass and throwing water upon them.)

Smartweed tea is recommended as being excellent for bringing a hog into good health at the first indication of anything being wrong. To make the tea, take common smartweed, in its green state, press out the juice, and mix it in the swill. Use just enough to make them sneeze hard. If one desires to use the herb the year around it will only be necessary to gather it when in bloom, tie it into bunches, and hang it in a dry, sheltered place. A tea can then be made by boiling the weed. The smartweed with the narrowest leaves is best for the purpose.

Keep a mixture of soft coal and wood ashes before the hogs. It is also well to add a little salt. To last 100 hogs about 4 months use about 5 tons of so-called slack coal, 4 barrels of wood ashes, and one barrel of salt. This can be kept in a box so that the hogs can dig it out from the bottom thus keeping them out of it with their feet.

Acute Indigestion.

Too fast eating of strange food; overeating, or fermentation of food already eaten; frozen food or gas develops acute or crampy attacks, and may cause rolling, or loud squealing. Immediate attention should be given as chronic cases develop from lack of attention.

Treatment.—Give a tablespoonful of aromatic spirits of ammonia every hour until the bloat goes down. Follow this up with a teaspoonful of ginger or a tablespoonful of powdered charcoal at a dose in the feed two or three times daily. Hot water is used by many farmers. Proper feeding will eliminate most of the diseases in stock. Read thoroughly all the Animal Husbandry Department.

Aphthous Fever.

This is a contagious, eruptive disease, appearing between the toes or in the mouth in the form of tumors. Contagion; improper feeding, and filth are the causes.

Symptoms.—Appearance of blisters or tumors on the mouth or between the toes; fever; perhaps dullness.

Treatment.—Isolate the diseased hogs and dress the hoofs with sulphate of copper or lime wash.

Thoroughly mix the manure with lime or a solution of one teaspoonful carbolic acid to a cup of water and put it where the other animals will not come in contact with it. Chloride of lime will act in the same way. Put some strong vinegar in the drinking water of the affected hogs or give them skim milk to drink.

Many hogs have been cured of aphthous fever by a solution of about one tablespoonful of salicylic acid to a quart of water freely applied to the diseased mouth and feet, also to the runs and houses.

Apoplexy.

This is an ailment that occurs in fat hogs. It is caused by an over-supply of blood and fat.

Symptoms.—The hog first acts stupid and restless; the eyes are prominent and blood-shot; suddenly the hog may drop as though hit with a sledge-hammer and the limbs become straightened and stiff; he may appear dead but for his heavy breathing.

Treatment.—If the attack occurs in hot weather put the hog in a cool place and supply cold packs or ice to the head. Keep the bowels loose by giving epsom salts in 2 or 3-ounce doses. Feed lightly. Proper care in feeding, especially if for fattening, will prevent too high a blood pressure. A veterinarian can bleed successfully and profitably if the hog is a good one.

Apoplectic Anthrax.

This is the most acute form of Anthrax. It seldom occurs in hogs and when it does occur it generally terminates so quickly that nothing can be done for the patient. The raiser usually comes just in time to see the hog fall down and die, or to find him dead before he even knew the animal was sick. This disease is caused by contagion; filthy quarters and grounds; poor feeding; and over exposure to heat and cold.

Symptoms.—Pain; swaggering unsteady gait; temperature changing from feverish heat to cold chills alternately and in rapid succession; very red mucous membrane; vomiting a discolored or bloody fluid; and convulsions. In some cases a carbuncle may make its appearance shortly before death.

Treatment.—We can suggest no cure for this disease. About all that can be done is to isolate the diseased hog if possible as a protection to the rest of the herd. The body should be burned or buried under a few inches of quick lime and the premises thoroughly disinfected. Some farmers write they have had success with this ailment by bleeding the hog.

Blind Staggers.

Over-feeding; filthy surroundings; and over-exposure in changeable weather cause congestion of bowels and blood rushes to the brain too swiftly.

Symptoms.—Hog acting stupid; running into objects; running in a circle; falling over and straightening out legs; frothing at the mouth; and rapid laborious breathing.

Treatment.—Put the hog in a dry, clean pen. Make it as comfortable as possible. Feed lightly. Many farmers draw a little blood which relieves

the pressure. Put cold water or ice packs to the head and give from 2 to 3 ounces of epsom salts. Repeat the dose of salts when necessary. Give a teaspoonful of calomel immediately. Next slit the skin on the head clear to the bone above the eyes and put salt and pepper in the opening. If this does not set up a counter irritation, apply a strong liniment on the upper part of the head and around the base of the ears. Feed lightly. Epsom salts may be given in 2 or 3-ounce doses in place of calomel to loosen the bowels.

Blood from Stomach.

Injuries to the stomach, from bunting, kicking, or when a pig swallows a bone or some other hard substance that causes bleeding.

Symptoms.—Vomiting blood (The blood should be examined and if it contains particles of food and is dark colored it comes from the stomach.) and a loss of appetite. There may be a coughing of blood.

Treatment.—Take a teaspoonful of cold water and into this put about ten drops of aconite and give as a dose every two or three hours.

Bronchitis.

As this disease is usually fatal great care should be taken with young pigs to see that they are not exposed to wet and cold, especially after being overheated; dusty quarters, lungworms, or condition of the atmosphere may cause it.

Symptoms.—Loss of appetite; cough; discharge of mucus from mouth (sometimes from the nose too); fast difficult breathing; holding head out; fever; weakness in limbs and stumbling.

Treatment.—Give good quarters and a well balanced ration. Feed lightly during the acute stage of the disease. Plasters on chest will give relief from pain. Steaming is often used. Give from one-half to two ounce doses of castor oil and allow the animal to inhale steam. Hold a vessel containing one-half per cent boiling hot water solution of tar disinfectant or turpentine close to the hog's nostrils, and allow the patient to inhale the steam for about ten minutes. Do this three or four times daily. Throw a light cloth over the head of the hog and over the pan to make the steam go into his nostrils.

Cancer of the Tail.

Sometimes during pigging time a sow develops sort of a cancerous condition of the tail which may cause the tail to fall off if it is not given proper care.

Treatment.—Reduce the feed of the sow for ten or twelve days after pigging and give a little sulphur (about a teaspoonful) two or three times a week. A mixture of turpentine and lard has given good results as an application as has kerosene oil with several drops of carbolic acid added.

Colds.

The causes are improper care, exposure to cold and wet; sudden changes in temperature; and filth.

Symptoms.—Discharges of mucus from the nose; coughing; heaving at the flanks, and loss of appetite.

Treatment.—Put the pig in a warm, dry pen. Feed loosening food such as warm slop and vegetables. A full tablespoonful of tar is good. Steaming with tar is also beneficial. Moisten some mustard flour with vinegar and apply it to the chest and throat.

Colic.

Eating indigestible or frozen food, too much exposure, and lack of range cause colic.

Symptoms.—Hog sits on its haunches; moves head from side to side; rolls; changes position frequently; grunts and sometimes bloats.

Treatment.—Drench the hog with some warm lard. Give the hog a teaspoonful of soda in a quart of buttermilk. Repeat in $\frac{1}{2}$ hour if necessary. Put soda in buttermilk just before giving. Mix a tablespoonful each of ginger and common baking soda. Dissolve this in warm water and use as a drench.

Congestion of the Lungs.

This is caused by stagnation of blood in the lungs; keeping fat pigs in close, filthy quarters. Feeding too much fat-making food is often a cause.

Symptoms.—Great distress; head held down and mouth open; weak pulse; cold extremities; pig cannot stand; in some cases blood running out of nose. Hard breathing is heard.

Treatment.—Act promptly to prevent this disease developing into inflammation of the lungs. Put the patient in warm, comfortable quarters and give stimulants. Either aromatic spirits of ammonia or $\frac{1}{2}$ teaspoonful of camphor in a glass of milk is good. Put warm woolen blankets on the body and rub the legs briskly. It is good to rub a solution of 1 pint witch-hazel and 1 teaspoonful of capsicum on the legs. Ammonia will act best in the beginning and the stimulants later.

Constipation.

Constipation keeps the bowels from doing their normal work. Such a condition shows that something is radically wrong in the swineyard. Bulk food, lack of exercise, a cold or other common causes bring on constipation.

Symptoms.—Passing of dry dung in compact, ball-like masses. Sometimes crampy pains and loss of appetite.

Treatment.—Give the hog exercise and a more cooling loosening diet. Green feed or soft mashers are good. Give stimulants and tonics if hog is weak. $2\frac{1}{2}$ drams of green soap; $1\frac{1}{2}$ oz. of linseed oil and 15 oz. boiled water divided

into five parts and injected into the rectum every half hour is good; 1 fluid ounce of syrup of buckthorn is often used. Prepare a bran mash with hot water and feed it to the constipated hogs.

Diarrhea and Scours.

Extreme looseness of bowels. Decayed foods; too much food; an inflamed and irritated condition of stomach and intestines; unsanitary conditions; improper action of liver; over-exercising on a hot day; all cause looseness in bowels.

Symptoms.—Extreme looseness of bowels. Much distress is shown and dung is yellow. An acid condition is shown by straining and vomiting.

Treatment.—It is important to remove the cause. Do not feed filthy food. Keep the place clean. A paste of flour and water is good and healthy. Castor oil is healing and can be given with good results. Plenty of water acts as a cleanser. 1 grain of rhubarb and 10 grains of calcium carbonate may be used. Any good astringent remedy will have the proper effect. Put a tablespoonful of air-slaked lime in the slop of the pigs about 3 times a week. Give the sow the amount of sulphur that will stand on a 5 cent piece, in a little milk or upon a small piece of bread. Give 1 hour before feeding.

Dysentery.

This is an inflammation of the mucous membrane of the bowels. It is accompanied by frequent passing of feces containing mucus and blood. There is too much acid in the system.

Eating rotten meat or vegetables; lying in cold damp places; inactive liver; worms, and constipation are many causes.

Symptoms.—Uneasiness; poor appetite; dullness; colic pains; little fever and bloat; bad smelling feces passing off dry at first, but later thin feces containing blood or mucus.

Treatment.—Give big dose of castor oil, followed by calomel and 25 drops of camphor. Give starch water. A teaspoonful of ginger is good in the last stages of their sickness. Give three times daily until relieved.

Eating of Pigs.

Treatment.—Keep a mixture of equal parts of sulphur, salt, wood ashes and soft coal before the sows. Do this just before farrowing time. She likes lime and eats the little pigs for that in their bones. If a sow is eating her pigs, try feeding her pork which is well salted. This is expensive and it is far better to prevent rather than to cure.

Enteritis.

Often improper food is taken into the lower bowels and develops an inflamed condition caused by colds; constipation; and drinking filthy water.

Symptoms.—Some indications are loss of desire to eat; fever; great thirst; much distress; diarrhea with feces showing red; weakness; and the mouth is dry and hot.

Treatment.—Keep the pig on liquid food for a few days and apply water and mustard to the belly each day. Any good cathartic can be given to move the bowels and after the action ceases to be caustic a healing remedy like olive oil should be given.

Epilepsy.

Overfeeding on rich food when the hogs are not receiving enough fresh air and exercise; exposure to changeable, stormy weather; injuries; faulty circulation; and other ailments cause thick blood or inflammation.

Symptoms.—First symptoms; dullness; hog is not inclined to move; and acts dull; blood-shot eyes; constipated bowels; and hard and quick pulse. Later symptoms—poor appetite; delirium (the hog runs about wildly, generally in a circle. He seems blind and runs into things. The breathing seems rapid and laborious).

Treatment.—Remove the cause if possible. If the attack occurs in hot weather put the hog in a cool shed. Move the hog's bowels by giving a dose of from 2 to 3 ounces of epsom salts. Tincture of aconite in four drop doses should be given every three hours. **Caution:** Do not give aconite if it makes the animal vomit. Rub a strong liniment on the neck twice daily at the point where the brain and spinal cord meet. Apply ice packs to the neck until the pig improves. Another good remedy is to give a teaspoonful of calomel immediately. Next slit the skin on the head clear to the bone above the eyes and put salt and pepper in the opening. If this does not set up a counter irritation, apply a strong liniment on the upper part of the head and around the base of the ears.

Erysipelas.

This is a very frequent contagious disease of swine, and is known by the inflammation of the skin and tissue adjoining. Wounds on the skin admit the germs to the blood cells. People are very much affected by this disease.

Symptoms.—First symptoms: weakness; dullness; unsteady gait; refusal of food; rooting in bedding; often burying of head or whole body in straw; lying down more than usual; changeable temperature; chills, with feverish heat following; fast pulse; constipated; excrements passed being dark colored and hard; efforts to vomit in some cases. Later and more pronounced symptoms; red spots on inside of legs, on abdomen, breast and neck; these spots soon turn to swelling; small blisters on parts of swollen surface; increasing fever; labored breathing; later the hind quarters of the hog are paralyzed, convulsions set in, and death results if the disease is allowed to run this far.

Treatment.—Open the bowels with salts or castor oil. Feed milk and eggs. Rub parts with hot milk. Open the blisters and apply a solution of 1 teaspoonful of carbolic acid in 1 pint of water to them. Give the hog lots of clear, fresh water.

Eversion (Turning Out of the Rectum).

Poorly kept, neglected pigs are subject to protrusion of the rectum. Straining in pig birth, diarrhea or constipation cause eversion.

Treatment.—Make the patient as comfortable as possible and give a diet of easily digested food. Empty the protruding part, clean it with warm water, gently return the part and push it up a little ways inside the opening. The finger should be oiled, with nails short and smooth.

Fits in Pigs.

Improper food regulation, worms and lack of exercise on account of small pens develop poor bowel conditions and cause fits to pigs.

Symptoms.—Poor appearance is first shown; then the animal shakes and trembles violently. The pig gets stiff, stumbles and struggles a short time. In a little while he gets up and acts well but later has another attack.

Treatment.—Proper attention and a wide range will do a lot toward proper regulation of health. Put $\frac{1}{2}$ teaspoonful of turpentine in $\frac{1}{2}$ cup of linseed oil and give in two doses. Repeat it each day if necessary for several days. Ginger in a mash is good to relieve worms.

Gum Mouth.

This disease manifests itself in eruptions of the small sacs in the cheeks, lips and tongue. It is a comparatively rare disease, but care should be taken to keep it from spreading. Contagion or filthy condition of premises cause this disease.

Symptoms.—Animal eats very little; restlessness; a little fever; distressful and staring expression of the eyes, slavering and gnashing of teeth. Later yellowish white pimples that are full of pus come on the cheeks, lips and tongue. These pimples, though yellowish-white at first, soon change to brown and then to black. There is a little swelling at the base of each pimple.

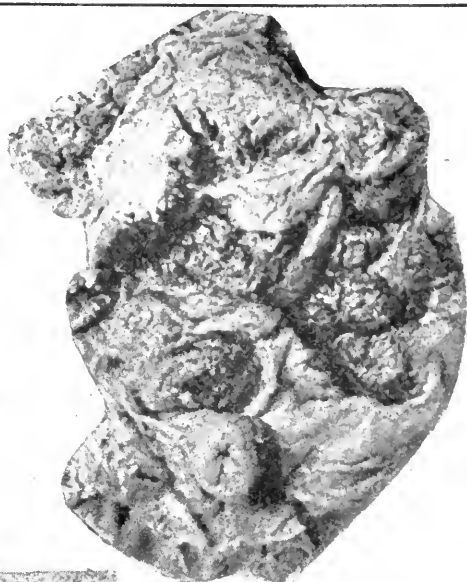
Treatment.—First isolate the sick animal to prevent spreading of the contagion. Put him in a dry, clean place. Put two ounces of alum into three pints of water and apply to the affected parts three or four times a day. Make a hot liquid food of milk and meal to feed the patient if he lacks strength. When the pimples appear, it will usually be best to open them with a sharp edged spoon (a tin spoon is good) and remove their contents thoroughly. Care must be taken not to allow the pig to swallow the pus. Also the operator must not allow any of the pus to touch him as it is dangerous should there be a break in his skin. Apply a weak carbolic acid solution to the sores after removing the pimples.

Hog Cholera and Swine Plague.

Hog Cholera and Swine Plague are so nearly alike that they will be treated as the same disease. The difference in them can only be told by examination of the dead body. In many states, the ravages of this disease cost the farmers over a million dollars annually. Hogs come down with hog cholera from about seven to fourteen days after being exposed.



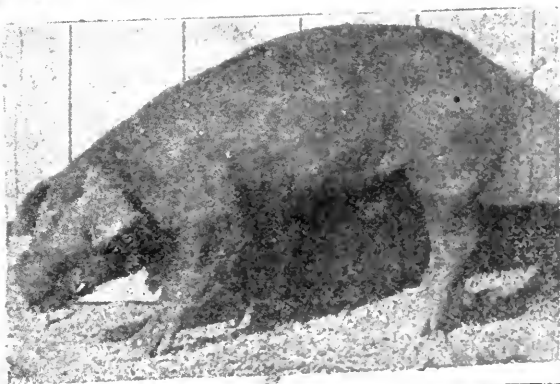
Lungs of a Cholera Hog



Ulcers on the Large Intestine
of a Cholera Hog



Method of Burning a Hog
Dying from Cholera



Hog With Cholera

Causes.—Hog cholera is believed to be caused by a germ or microbe so small that it cannot be seen with the most powerful microscopes available. This germ is present in the blood and excretions of sick hogs, especially in the urine. Whenever these germs come in contact with a hog, they begin their work immediately and this makes hog cholera highly contagious.

Predisposing Causes.—There are many factors which make a herd more susceptible to hog cholera such as: insanitary condition of hog lots, improper feeding, cold or damp sleeping places, confinement, privation, and dirty feeding and drinking troughs. In fact, anything that lowers the vitality of the herd helps to make hogs easy victims to this disease.

Symptoms.—Hog cholera manifests itself in both an acute and chronic form. In the former, the animals die within a few days while in the latter they may live for several weeks. In its acute form, the main symptoms are: loss of appetite, sluggishness, weakness, disinclination to move, shivering, high fever, hiding under litter, lying on belly, weakness of hind limbs at first and later of front limbs, inflamed eyes and gummed lids, red or purplish blotches on the skin, especially on the abdomen, inside the legs and around the neck and ears, rapid, weak pulse, dry snout covered by blood-stained spots, intense thirst, bowels tight at first but later loose and offensive, tender abdomen, and often a hard cough.

In the chronic form of the disease, the symptoms are similar to those found in an acute case such as: sluggishness and disinclination to move when disturbed, coughing when suddenly aroused, loss of appetite and flesh, growing so weak they walk with an uncertain gait, sometimes staggering, hind legs particularly weak, eyes inflamed and lids gummed together, profuse diarrhea.

The symptoms of hog cholera are not particularly characteristic and only such as might be observed in any severe disease. But if these symptoms appear in several or all of the hogs in a herd and the disease is seen to be contagious, cholera is probably present, though the only sure way of telling is by holding a post-mortem examination.

Simple Method of Examining a Hog After Dying From Hog Cholera.—Lay the hog on his back and make an incision through the skin and underlying fat. Begin at the throat and cut the entire length of the body. Next cut under the skin covering the chest so as to expose the ribs. Now sever the ribs, beginning at their lower border about one or two inches on either side of the breast bone and cutting toward the head, and remove them entirely. Next make crosswise cuts from the first long incision toward each leg so that the skin may be laid back on both sides of the body.

Caution.—Do not injure the organs in opening the carcass. Also avoid having any open cuts or bruises in your hands where germs might enter. Cholera germs will not affect man but the body of a hog may be full of other germs that might prove dangerous.

Important Symptoms Found in Post-Mortem.

Red spots on the skin.

Bloody spots in the kidneys, on the surface of the heart, in the lungs, or the outer and inner surface of the stomach and the intestines.

An enlarged spleen. (The spleen is found on the right hand side as one views the hog on his back. It lies a little below and to the right of the stomach).

Reddened lymphatic glands. (These glands are easily recognized by the farmer. The ones to be examined are in the fat immediately under the skin of the abdomen near the center between the hind legs).

Ulcers on the inner lining of the large intestine.

All of the above indications are seldom found in a hog that has died from cholera. In acute cases the hog may show only an enlarged spleen or a bloody condition of the lymphatic glands, while in chronic cases there may only be the button-like ulcers in the large intestine.

Preventive Treatment.—Hog cholera is easier to prevent than it is to cure. The preventive measures to be followed are: Keep all newly purchased stock away from the herd for at least thirty days, give the hogs clean, dry sleeping places, keep the feeding and drinking troughs clean, scatter slaked lime about the lots occasionally and disinfect the troughs and buildings with a compound solution of cresol (U. S. P.) or carbolic acid, do not put hogs that have recovered from cholera with susceptible ones for at least two months after complete recovery and then dip them in a disinfectant solution first (compound solution of cresol 1 to 100), protect the hogs from hot, reeking beds of manure, keep away from all places where the disease exists, a man may carry the germs on his shoes; keep all persons away from your place who have been where the disease exists, separate the well and diseased animals; burn, or if buried cover with lime, all dead bodies; do not leave slop or water in the troughs for the hogs to wallow in; keep the animals in good vigorous health.

Many farmers have kept their hogs from getting cholera by using one of the following receipts;

Two pounds each of Copperas, Sulphur and Madder, one-half pound each of Saltpeter and Black Antimony, and two ounces of Arsenic. This quantity is enough for 100 hogs. It is put in the slop allowing one small tablespoonful to each full grown hog once a day. This receipt was recommended by a prominent farmer in Illinois who writes that every time he tried it he had about fifty head of hogs and that not one of them died that could walk to the trough and drink the preparation.

Thoroughly dissolve one pound of Copperas in three gallons of water. Apply this as a wash to the affected hogs whenever the skin begins to look scaly and rough, or of a dark red color. Have the wash about milk-warm and apply by dipping the hog into a barrel containing the solution or rubbing

the solution on the hog until thoroughly wet. Apply the wash every day until the scales are removed. Begin to use it before the alarming symptoms of purging and vomiting set in.

For hog cholera the following prescription is the most effective remedy I have ever seen tried writes a man who should know: Flour of Sulphur 8 ounces, pulverized charcoal 4 ounces, pulverized capsicum 2 ounces, pulverized rhubarb 3 ounces, carbonate of iron 8 ounces, pulverized golden seal 1 ounce. Mix thoroughly when ready for use. Put in air tight package to preserve the strength.

Preventing Hog Cholera and Swine Plague by Vaccination.—A great many hogs may be saved by treating the herd with a properly prepared serum. There are two methods of treatment as follows:

Serum Inoculation.—In this method the hogs which are to be protected are injected on the inside of the hind leg with a dose of serum alone. This injection will serve to protect them for several weeks and in case those treated become exposed to hog cholera during this time, they will, so far as experiments have shown, be protected for life.

Simultaneous Inoculation.—The same serum is used in this method as is used in the serum inoculation. However, in addition to the serum, there is injected on the opposite side of the body a small amount of blood taken from a hog sick with cholera. This treatment confers a lasting and permanent immunity upon the hogs.

The length of time that protection is desired should govern one in his choice of the method of vaccination to be used, remembering that the "Serum inoculation" protects the hogs only for a few weeks unless exposed, while the "Simultaneous inoculation" protects them for life. Vaccination should be used mainly as a preventative. Little success can be expected in herds that are badly affected before the vaccinating is done.

In many states the law permits the farmer to inoculate his own hogs which if done temporarily, needing repetition, will save considerable for the farmer. It is safe if directions given with the serum are followed closely.

If you find a case of cholera in a herd bend every effort at once to stamp out the infection and prevent its spreading. Careless, indifferent treatment is of no use in hog cholera. Isolate the affected animals and disinfect the premises thoroughly. Feed a very light ration of thin slop of shorts or other ground feed. Powdered copper sulphate can be given in the drinking water and feed. Eight ounces of the powdered drug may be dissolved in one gallon of warm water and a pint of the solution added to every ten gallons of water and slop fed. Diet the whole herd, feeding only what they will clean up quickly. Do not leave anything in troughs for the hogs to wallow in, disinfect the troughs thoroughly after each feeding and turn them upside down. Burn all dead bodies or bury them. In burying, cover the bodies with a few inches of quicklime. At the end of an outbreak, clean and disinfect the premises thoroughly.

Indigestion.

Insufficient change of diet, lack of exercise, or eating poor food are the usual causes of indigestion in all animals.

Symptoms.—Bowels either "bound up" or too loose; no desire to eat; animal coughs; urine is dark colored and stinted. The hog usually has a slight fever.

Treatment.—In loose bowels an astringent should be given and then a dose of raw linseed oil will have a healing effect. A dose of castor oil is from one to two ounces and is good. If bowels are costive, give from one to two ounces of salts. An injection of warm water helps. Coffee is good to prevent sickness of the stomach.

Inflamed Eyes.

Exposure to heat; cold or sunshine; foreign bodies entering the eyes; and living pens where there are foul vapors develop bad eyes.

Symptoms.—Inflamed eyeballs and tears falling over the cheeks.

Treatment.—Examine the eyes to remove any foreign substance and put the pig in a dark pen. Wash the eyes with hot water and apply boric acid and water (as much acid as the water will dissolve). If a scum comes over the eyes, blow some calomel into them once each day.

Inflamed Udder.

Exposure to cold and wet, poor care, and loss of pigs leaving milk unused develops sore and caked udders.

Symptoms.—Fever, a hard udder and drying up of bag; no desire to eat. This may ruin the sow for further breeding so a good pigging or farrowing pen should be used.

Treatment.—Keep the bowels loose with Glauber's salts. Wash the udder with hot water several times daily. Apply camphorated vaseline to the udder once each day. Lard is a good application to apply freely.

Inflamed Womb.

Many times a sow is not assisted properly in pigging; or is kept in an ill-smelling, damp pen after pigging; or the rectum is turned out. Cleanliness is essential in treatment of all animals.

Symptoms.—Dullness; no desire to eat; fever; and much distress.

Treatment.—The fever should be reduced by giving saltpeter, and the womb washed out with boracic acid and warm boiled water. Put plenty of the acid in the water. It is very good for cleansing and healing. To inject the solution a fountain syringe will be found well adapted to this work.

Kidney Worms.

Many worms affect the different parts of an animal. Passage of them or the eggs show their presence, as does also a poor appearance. Worm-

seed is often given; a teaspoonful of turpentine to a gallon of liquid food is used by many farmers. Kerosene dips will give good results; kerosene given internally in small doses have brought improvement in the animal.

Lameness.

Bruises, cuts, lack of good bone building food, and kicks cause lameness. Constipation develops a contracted action of the muscles often which makes an animal lame. Plenty of wood ashes and salt or soft coal kept before the hogs will keep them from being lame. Lump sulphur is used by many hog raisers.

Lice.

On account of the bristles it is easier to treat for lice than on other animals with more hair. It is also easy to rid a hog, in fact to rid the premises of lice, so no place should have them. Clean pens are not infected by lice. White-washing often brings relief. Tobacco washes are often used. Kerosene rubbed or brushed on with a broom gives good satisfaction. The buildings must be fumigated. Formaldehyde applied with a sprayer is practical. Sulphur burned carefully is a common remedy.

Liver Diseases.

There are so many diseases caused by too much or improper food, and too little exercise that diagnosing a disease is hard for an inexperienced man. Following closely the symptoms will give good results. Lack of exercise; over-feeding on rich foods, and ill-kept surroundings cause liver disease.

Symptoms.—Coughing up irregular matter as well as bad digestion and sluggishness are always seen at this time.

Treatment.—One should attend to the treating of this disease promptly and carefully to prevent other and perhaps more serious complications from starting. See that the hog has clean quarters and good clean water to drink. Relieving the bowels gives the best results. Salts or ginger and soda (1 teaspoonful each) in warm water, or buttermilk have a good effect. Linseed oil heals the bowels in excessive action.

Malignant or Gangrenous Angina.

Description.—Malignant Angina is a form of Anthrax that affects swine quite frequently, generally appearing as an epidemic and spreading over a large territory. It has its principal seat in the throat. Angina may be present with other diseases especially malignant erysipelas. Contagion; filth; exposure and poor condition cause it.

Symptoms.—Laborious breathing; wheezing; swelling of tongue; hoarse grunting; dryness of snout; brownish-red color of the mucous membranes of the mouth; trying to vomit; difficulty in swallowing food; a swelling on the throat that is painful, hot and hard (this swelling sometimes extends as far as the lower surface of the chest and presents a crimson or red appearance

at first followed by reddish lead-gray and then purple), and a high fever. The difficulty in breathing increases until the animal may even die of suffocation. He may make desperate attempts to catch a little air by opening the mouth and protruding the swollen tongue. The hog has a high temperature at first but in the later stages of the disease the temperature may go below normal.

Preventive Treatment.—Giving a little carbolic acid in the drinking water or feeding unripe sour apples or sour buttermilk may help prevent your hogs from getting this terrible disease when it is in the neighborhood. The treatment to be at all effective in this disease must be begun when the first symptoms make their appearance. First give an effective emetic of from three to twenty grains (depending on the size and age of the animal) of powdered White Hellebore or of Tartar Emetic. The former is probably more reliable. Give this medicine in a little milk if the hog will drink it. Other ways of giving it are in pieces of boiled potato or a pinch of flour and water in the form of pills.

Caution.—Do not give these as a drench. Repeat the dose if the hog does not vomit in about twenty minutes. This treatment may be followed with doses of calomel, saltpeter, sulphate, or soda to advantage. Many people find that injections of the following solution made through the skin into the swollen parts of the neck at various places give better results than anything else; Carbolic acid $\frac{1}{2}$ teaspoonful, glycerine 1 teaspoonful and water 1 teacupful. Blood letting is sometimes satisfactory if resorted to in time. If done too late it only hastens death.

Mange—Scab—Itch.

This is an ailment of the skin caused by a parasite and easily carried from one hog to another.

Symptoms.—Severe itching; large sores caused from rubbing; scabs on the skin.

Treatment.—In treating mange, purify all objects around the animals such as sties and rubbing places by covering them with lime or chloride of lime. Wash the hog with a decoction of Tobacco (4 teaspoonfuls of tobacco to 1 pint of water) or Caustic Potash (2 teaspoonfuls Caustic Potash to 1 quart water); or concentrated vinegar. A couple of days following a thorough application of one of above washes, scrub the hog well with soap and water and apply the following:

Mange Ointment.—Melt $1\frac{1}{2}$ pounds of lard and $\frac{1}{2}$ pound of turpentine together. Add 1 pound of Flowers of Sulphur to this and mix well. When cool rub 2 ounces of strong Mercurial Ointment into the mixture. This can be done on a stone slab. Glover's Mange cure is a very well-known remedy.

Measles.

This is a contagious disease in hogs that is quite common. It is similar to measles in people and may be carried back and forth between the house and pens.

Symptoms.—In many cases the animal sneezes and coughs, but if the case is light, no sickness may be observed. In bad cases there is a loss of appetite, a rash breaks out in about four days (this is more easily seen on white-skinned hogs), the throat is sore, the eyes inflamed, the temperature high, and the pulse is rapid. The disease begins to go away about the sixth or seventh day. Be very careful of relapses. They develop more serious diseases.

Treatment.—Practically all the hogs need when they have measles is good care and protection from storms, filth and wet. They seldom need medicine unless it is something to check the cough or diarrhea or to loosen the bowels. Milk and red pepper is good, also an egg fed to the hog. If the hog shows weakness strong lye-like coffee will revive it.



A group of well grown and well finished hogs.

Morbid Appetite.

Bad foods usually have sour material which makes an excess of acid in the stomach. This condition causes the hog to lose its desire to eat and causes it to lose flesh. Regulate the feed. Put in closed pen for a while.

Treatment.—Put the hog on a light diet which is easily digested. Many farmers give a mixture of charcoal, ginger, and common baking soda. Egg shells, sour milk, soft coal, and even soft wood and acorns neutralize the condition.

Nasal Catarrh.

During a dry summer catarrh is prevalent in both animals and people. Dust, chaff, grass seeds, and golden rod pollen have a great effect on animals in developing catarrh and asthma.

Symptoms.—Membrane of the nose swollen and dry; sneezing; no desire to eat; discharge and inflammation of the nose.

Treatment.—Give the affected hog 15 grains of saltpeter and 2 drams of ginger. Follow this with two-grain doses of quinine several times daily. The animal should be given good care. Strong salt water cleanses the stomach. Smartweed may be given. Mint leaves are good for clearing out the passages.

Navel Hernia.

Sometimes a pig lays on a sharp stick or falls upon one and when it rises the bowel or part of one comes through. Also in farrowing a projection of the bowels through an opening is not uncommon. Reopening of an improper tied navel often permits a bowel to come partly through.

Symptoms.—A puffy soft bunch at the navel which can be pressed back through the opening into the body. If the rupture is small, it seldom causes trouble and needs nothing done to it unless it stops the circulation. A protrusion is dangerous however as the bowel itself might be punctured and the inflammation set up may develop complications.

Treatment.—Place the pig on its back and press the bowel and covering back into place. Pick up the hide and put two wooden pins which have been boiled and sterilized through it at right angles to each other and close to the abdomen. Tie a string around back of these pins and close to the body. Do not tie the string too tight. This operation causes the skin to soon unite. The loose skin drops off in about ten days and the pig is well. Many farmers have explained this and it is an easy and safe method if just proper common sense precautions are taken to prevent infection.

Obstruction of the Bowels.

Eating bones, rooting in gravel, too hard coal, bad food and clusters of worms attached to bowel lining is called obstruction of the bowels.

Symptoms.—Sometimes the trouble starts quickly and severe pain results. It is a serious ailment and great care should be taken to keep the bowels from becoming punctured from the inside. In such instances there can be no cure and the animal dies.

Treatment.—Giving soapy water causes vomiting and may bring up the obstruction. Linseed oil or any medicine that may grease the passages will help to release the obstacle. An injection of warm soapy water will help.

Paralysis.

Severe straining of the back resulting from some accident while young or being stepped upon by another animal affects the spinal column and develops a helpless condition due to loss of the muscles. The base of the brain is often affected; blows on the loins; mistakes in feeding; or other ailments also cause it.

Treatment.—Put the hog in comfortable quarters where he will not be disturbed. Feed on soft, sloppy food. Sour milk is good. Keep the bowels loose with injections of warm water or from two to three ounce doses of Glauber's salts. Breaks in the spine are not curable, but if killed immediately the hog will be good for meat. If the cause is known to be a strain of the back, use cold application on the back for several days, or apply a strong solution of mustard and water to the affected animal's back each day. Equal parts of lard, ammonia and turpentine make an excellent liniment to apply to the back of a hog suffering with paralysis and have been recommended by farmers in Ohio and elsewhere.

Paralysis of the Retina.

People and animals are often affected by the dilation of the pupil of the eye which may cause blindness. It is often an ailment of the digestive organs due to constipation, high blood pressure or intestinal parasites which really cause clogged bowels.

Treatment.—Keep the hog in a dark, clean pen with good ventilation. Pumpkin seed tea is good for worms and will remove one of the worst causes of the paralysis. Cathartics should also be given.

Peritonitis.

When any article taken into the intestines makes an internal rupture, an inflamed condition of the membrane lining the abdominal cavity usually takes place and blood poisoning often follows. The mortification or hardening is almost incurable. Injuries such as kicks from horses or bunts from cattle; puncturing of the stomach; severe chills and other diseases, cause the internal injury. It may follow castration or farrowing.

Symptoms.—Pain; bloating; fever; tenderness of the stomach; vomiting; and quickened pulse. The indications are very plain and the attention that must be given is considerable.

Treatment.—Keep the strength of the animal up with milk mashes or, in severe cases, aromatic spirits of ammonia. Proper care by a veterinarian at the first signs of this ailment will get the better results.

Piles.

These are soft bright red tumors found in or near the outer opening of the large bowel. They usually bleed very easily. Sometimes they are called fluid piles because there is no bleeding. Sitting back on damp muddy floors and cold ground are common causes.

Treatment.—Add some tannic acid to cold water and use as an injection. Give a cathartic of Glauber's salt or castor oil. When it is thought best to open the tumors and let out the impure blood, use a thin sharp knife. Hot applications may be then applied or anodyn wash is good. Injections of slippery elm juice or mucilage are considered good.

Pleurisy.

Many hogs as well as other animals catch slight colds and the membrane which lines the chest and covers the lungs becomes inflamed and is known as pleurisy. It may develop into pneumonia. Hogs should not sleep in cold beds, or be exposed to drafts or winds when warm or injured. The air passages may be easily affected.

Symptoms.—Fever; coughing; uneasiness; fast breathing; the back is bent and pressure on side causes flinching.

Treatment.—Give the hog dry, clean quarters. In case the bowels are too tight, give him two ounces of Glauber's salts in warm water. In case the animal does not urinate freely, give a teaspoonful and saltpeter three or four times daily. Jamaica Ginger is fine for the inflammation and may be given in tablespoon doses several times a day. It is also very good as a stimulant.

Pneumonia or Lung Fever.

A slight cold due to exposure often develops into more serious diseases and an inflamed condition of the lungs is the most common. Light blood often aids. Corn fed properly gives much heat and prevents many chances of exposure.

Symptoms.—The animal chills, then fever develops; quickened and laborious respiration; loss of appetite; severe coughing and pain tell of the presence of inflammation.

Treatment.—Give the hogs clean, warm, comfortable quarters and access to saltpeter once a day; 15 drops of aconite will reduce fever. Give strong coffee to prevent vomiting.

Quinsy.

This is a disease that appears frequently in hogs. It is generally confined to fat hogs or those highly fed. It is rapid in its course and often fatal. While at first it is easily prevented and taken care of, later it is very hard to treat successfully.

Symptoms.—Soreness and swelling of glands under throat followed by difficult swallowing and breathing; protruding of tongue from mouth covered with slaver. There may be spots on the glands comparing with tonsils in people.

Treatment.—At the start, give an active emetic, such as 4 grains of tartar-emetic (potasio-tartrate of antimony); 6 grains of White Hellebore; and 6 grains of ipecacuanha. Mix and throw into the mouth or give in the feed. If the hog can eat give 2 or 3 ounces of castor oil to clear the bowels. If the hog has great difficulty in breathing, put an active blister on the throat and give injections often. If the animal can drink water, dissolve a teaspoonful of Nitre and Salammoniac in it. If a hog has a case of quinsy, split the neck open on each side of the throat so it will bleed freely, then swab the

throat well with turpentine. Also make the hog swallow from 1 to 2 teaspoonfuls of turpentine. This can be put in the swill when the patient can drink. Enough turpentine poured on corn to make it oily is a good preventive.

Rheumatism.

Colds settling in the limbs and the loss or drying up of some of the joint fluid is thought to cause this ailment in animals and people. Some hogs seem to be more disposed to it than others and when an exciting cause arises they become affected immediately. It is very common, yet hard to treat.

Symptoms.—Indisposition to move; languor; dullness; extreme lameness in one or more limbs; swelling; heat; or tenderness of a tendon, joint or bunch of muscles. The soreness may shift from one joint to another.

Treatment.—Give the pigs warm, well-littered houses to go into any time they choose. Feed steamed or boiled food and sour milk so as to get a bowel action. Good liniments are usually used and can be made at home from vinegar, eggs, turpentine and even lard added. Give a tablespoonful of cod-liver oil to each pig once or twice a day in the feed. Cod-liver oil often not only cures rheumatism, both chronic and acute, but also greatly improves the condition of the pigs.

Rickets.

This is a condition in hogs caused by lack of proper foods containing lime salts and affects the bones. Cold, damp buildings, improper feeding, infection and weak constitutions are causes of the lack of health. The ribs and long bones of the legs are most affected. The bones become thicker than usual and the gait is stiff and painful. Discharges as in catarrh of the stomach take place.

Treatment.—Correct improper conditions, giving plenty of sunshine, fresh air, exercise, food, and tonics are the best remedies. Plenty of lime salts in the foods, lime in the drinking water and bone meal, will strengthen the bones.

Ringworm.

This may break out over the body but is uncommon in hogs. It appears in the form of rings and the hair drops from the skin in ringlike patches, the center of the patches becoming dry and the edges moist. Sweet oil is good if well rubbed in; kerosene will cleanse it thoroughly. Or apply iodine with a brush. Sulphur and lard keeps the sore soft and helps it heal.

Scaly Skin Disease.

Exposure to heat and cold during all seasons causes skin to become frost-bitten and crack, often making pus-like sores which scale over.

Symptoms.—Appearance of pimples from which fluid oozes. This fluid hardens and forms scales which come off.

Treatment.—Give good dose of salts and feed light food with lots of sour milk for several days. Sulphur and lard or buttermilk and kerosene will cleanse the skin thoroughly. Sweet oil or carbolic salve which can be made in bulk at low cost is fine. Many farmers save a lot of money by getting the ingredients of well-known salves, ointments and patent medicines and mixing them up for their own personal use. In another section we give many practical ones.

Scarlet Fever.

Many of the diseases with a rash are confused with one another; as, for instance, scarlet fever and measles are similar. About a week is required for relief. It will spread from contact with other animals that have the disease, or with man; dirty pens or low vitality in pigs makes them susceptible.

Symptoms.—It may be distinguished in many ways and sluggishness, slight lameness, some fever, and poor appetite with increasing thirst are the more common indications.

Treatment.—Many pigs pull through a case of scarlet fever without any special treatment. The affected animal should be separated from the rest of the herd and given good clean quarters. Salts may be given if the bowels are tight but care should be taken not to get the bowels too loose. Quinine and ginger should be given about three times daily when the pig is weak. Spray the throat several times a day with a solution made by dissolving a handful of salt in a quart of water. This will relieve the soreness. A lemon juice spray is also good.

Snuffles.

So many hogs are exposed to cold rains and weather that they take and develop colds which are really continuous. It may run into more serious a distemper which usually results in death. Such animals should be killed and buried or burned.

Symptoms.—Discharges of mucus from the nose; discharges of blood (in severe cases); snuffling, chills; and some constipation.

Treatment.—Put the pig in a warm, dry and clean pen. Protect him from further exposure. Avoid over-feeding and feed loosening foods to keep the bowels in good condition. Clear out the nose by washing it with a solution of listerine and water several times a day. If the bowels are costive, give from two to four ounces of epsom salts. Plenty of salt should be kept in the pen.

Sore Feet or Founder.

Confinement in pen with hard cement floors and drinking cold water after overfeeding with heavy grain often develop a case of founder. The sensitive linings of the feet seem to act in sympathy with the abused lining of the bowels.

Symptoms.—Lifting the fore feet and placing them down easily and farther apart than usual is a good indication of sore feet. Often twitching of the tail.

Treatment.—Keep the bowels opened with salts, laxative foods like turnips, beets, and green fodder. If sores come on the feet walk the pig through a trough containing blue vitriol water. Butter of antimony is good for healing these sores. If the pig gets foot sore in the winter, apply hot packs, but if he goes sore in the summer allow the pig to run where he can stand on clay ground.

Sorehead.

Sometimes there is soreness back of ears and a discharge of yellow matter. This matter gives off a very disagreeable odor and is not pleasant to treat. Thorough cleansing with warm water and an application of turpentine will aid in healing. Kerosene oil and lard will make a good salve to keep away flies and prevent poisoning. A teaspoonful of sulphur can be given in the feed each day. It dries up the sores.

Sore Throat.

This is a disease common in all animals and people. The causes are common as well as symptoms and treatments. Wet feet or weak lungs, and lying in cold water or snow with poor ventilation usually brings it on.

Symptoms.—Spots come in throat, head fills up and there is a smothered cough. Swallowing is hard and there is loss of appetite and slow, restless movements.

Treatment.—Three ounces of castor oil or linseed oil should be given to move the bowels. Doses of alum, several times a day, act well if given during the first stages of soreness.

Stunted Pigs.

Most young pigs are affected with worms which cause indigestion and the food strength is not utilized by the system. Growing ceases and small scrawny pigs are the result. Improper nourishment will also stunt them. They eat as much as a growing pig so should not be kept in this condition any longer than is necessary. A teaspoonful of turpentine is one of the best worm remedies and it is best to remove the cause right at the start. A milk diet will often give the proper nourishment. Oil meal or some good conditioning powder with plenty of salt will tend to give the best results. Many farmers get good results by using a little castor oil and kerosene.

Thumps.

This ailment attacks fat young pigs; they do not have sufficient exercise and are affected with worms. This may be a common condition and can be prevented by proper regulation of food, plenty of beans and cowpeas fed to

the sow before farrowing. Coughing, especially in the morning when the pig comes from his bed; jerking of body, and the pig may fall to the ground. Cold water and rubbing will aid in recovery.

Treatment.—In case the pigs are too fat, the sow should be taken from them for a while during each day. Proper and plenty of exercise will do wonders towards keeping the litter in good condition. At the first sign of thumps all of the pigs should be treated the same, as they are all subject to the same condition. Eggs and milk with bran added and thrown into the trough will help much in the treatment of this disease. Pigs that are given lumps of tar several times will react satisfactorily.

Mix a little tartar-emetic with the drinking water or with the milk for from five to ten days.

Tuberculosis.

Tuberculosis in hogs is closely associated with the same malady in cattle. It is caused by germs or bacteria and affects the various organs of swine; feeding unpasteurized skimmed milk; allowing hogs to run behind tuberculous cattle and feed upon the undigested grain in the manure; feeding uncooked carcasses of other animals that contain tuberculosis germs; consumptive attendants; and eating carcasses of tuberculous fowls.

Symptoms.—The symptoms of tuberculosis have no very decided characteristics. In intestinal tuberculosis there is often a general disturbance of the digestive functions and diarrhea or constipation may result. In advanced tuberculosis of the lungs there is a dry, persistent, harsh cough and rapid breathing, especially when exercised. The cough cannot be distinguished from that caused by lung worms. In severe cases of the disease there may be continued falling away and weakness. Most cases of tuberculosis are not recognized until the hogs are killed. In cases where the disease can not be told by the symptoms exhibited, the tuberculin test is recommended which makes it possible to detect the disease in its early stages and to stamp it out by killing the affected animals.

Tuberculin Test.—The intradermal method of using the tuberculin test has given excellent results on hogs. Full credit for the perfecting of this test should go to the Animal Industry Bureau, Washington, D. C., and State Experiment Stations. In this method two drops of tuberculin is used. This is prepared by evaporating away two-thirds of the volume of the tuberculin obtained from the Bureau mentioned above for the subcutaneous tuberculin testing of cattle. It is injected into the skin, not under it, near the base of one of the hog's ears. If the hog is affected with tuberculosis, the ear will swell near where the injection was made in about forty-eight hours and will remain swollen from 10 to 12 days. If there is no infection no reaction will take place.

Treatment.—By applying the tuberculin test when tuberculosis is suspected, the diseased hogs can be determined and killed before the whole herd is affected and the hog raiser can thus clean up his herd with as little loss as possible. After removing the diseased animals the place may be thor-

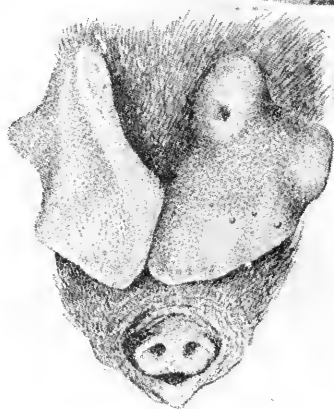
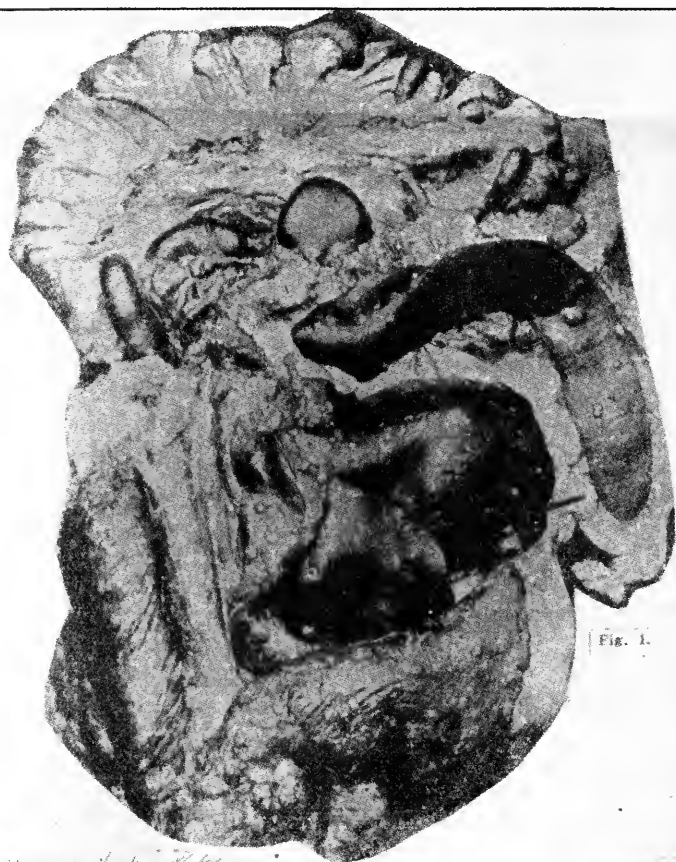


Fig. 2.

1. Intestines, lungs, liver and spleen of a hog affected with Tuberculosis.
2. Hogs tested for Tuberculosis. The enlargements show the result of a positive reaction.

oroughly disinfected by cleaning up all loose dirt, tearing out all decayed wood-work, and scrubbing the walls of the houses with hot water. Next a coat of lime containing a good disinfectant should be applied to the walls and in all dark places on the premises.

Preventive Treatment.—The prevention is to remove the cause, by pasteurizing milk, cooking meat, etc., that is fed to the hogs.

Vomiting.

Sometimes the food a hog picks up has an irritating action on the stomach and causes it to throw up its food. Weakness may also be the cause. People often give strong coffee or a little camphor in water. Ginger and soda are fine, all of these can easily be given to the hog. Mint leaves or smartweed thrown into the pen will help in regulating the stomach.

Warts.

Warts often develop in skin surfaces that have been bruised and filled with dirt. Bruising it continuously causes it to grow larger.

Treatment.—A small wart can be cut off with a small silk thread. A drop of carbolic acid will sear over the wound and keep it from bleeding. Acetic acid or nitric acid applied to the wart only, and not the surrounding skin, will cause it to go away and the surface will become smooth. Warts should be cared for when starting.

White Bristle—Anthrax Carbuncle.

This disease does not often appear in hogs.

Symptoms.—High fever; carbunculous swelling that is extremely painful on the neck near the larynx. (The hair on this swelling is soon bleached and stands on end. It is brittle and hard, therefore, it is called White Bristle). In the later stages of the disease, the following symptoms are prominent: grating and gnashing of teeth; laborious breathing; groaning; and convulsions. The diseased hogs die within a few days.

Treatment.—The general treatment is the same as for Malignant Angina. As a local treatment, destroy the carbuncle as soon as possible by burning it with a red hot iron or by applying concentrated acid. The treatment must be prompt and the animal must be given close attention to secure the best results.

Worms.

Practically all hogs and animals have worms. Hogs eat the remains of dead animals which contain the worm eggs. These soon develop inside the hog the same as bots in horses. Constipation and improper digestion make it very easy for worms to live in a hog's stomach. Once a hog gets sick it is hard to cure.

Symptoms.—Stomach pains, scratching extremities, rubbing up against posts and barns or buildings while giving a pleasant feeling is also done in trying to rid the intestines of the clinging worms. Often worms are passed in the feces and clusters come forth.

Treatment.—Cleanse the bowels with cathartics and injections and then give a tea made from boiled pumpkin seeds. This is one of the finest remedies. The whole system seems to respond and practically every worm is removed. Then the proper thing is to keep everything clean. Tobacco is given by many farmers while salt and ashes are kept in the pen by others. Turpentine added to the swill is always recognized as one of the surer reliefs for worms in all forms and all animals. A teaspoonful in a gallon of liquid food will do good. Give several times a week, is the usual statement.

From 5 to 8 grains of calomel and 3 to 5 grains of santonin for every hundred pounds live weight. Make a powder of this mixture large enough for from ten to fifteen hogs. Divide the herd into bunches of this number. Place ground feed in a trough and sprinkle one of the powders over the feed. Dose the hogs in the morning after keeping them off feed over night. A remedy for worms in hogs is to feed nothing for one day and then to a 100-pound hog give a tablespoonful of a mixture of half turpentine and half raw linseed oil or castor oil. The dose for smaller pigs should be proportionately reduced. Always keep a mixture of wood ashes and salt where the hogs can get it, using about a half bushel of ashes to five pounds of salt. Cob ashes will do just as well.

Wounds and Cuts.

Apply one teaspoonful of carbolic acid in a teacupful of water to the wound or cut several times daily, or put one teaspoonful of coal-tar disinfectant in a teacupful of water and apply to the wounded part each day.

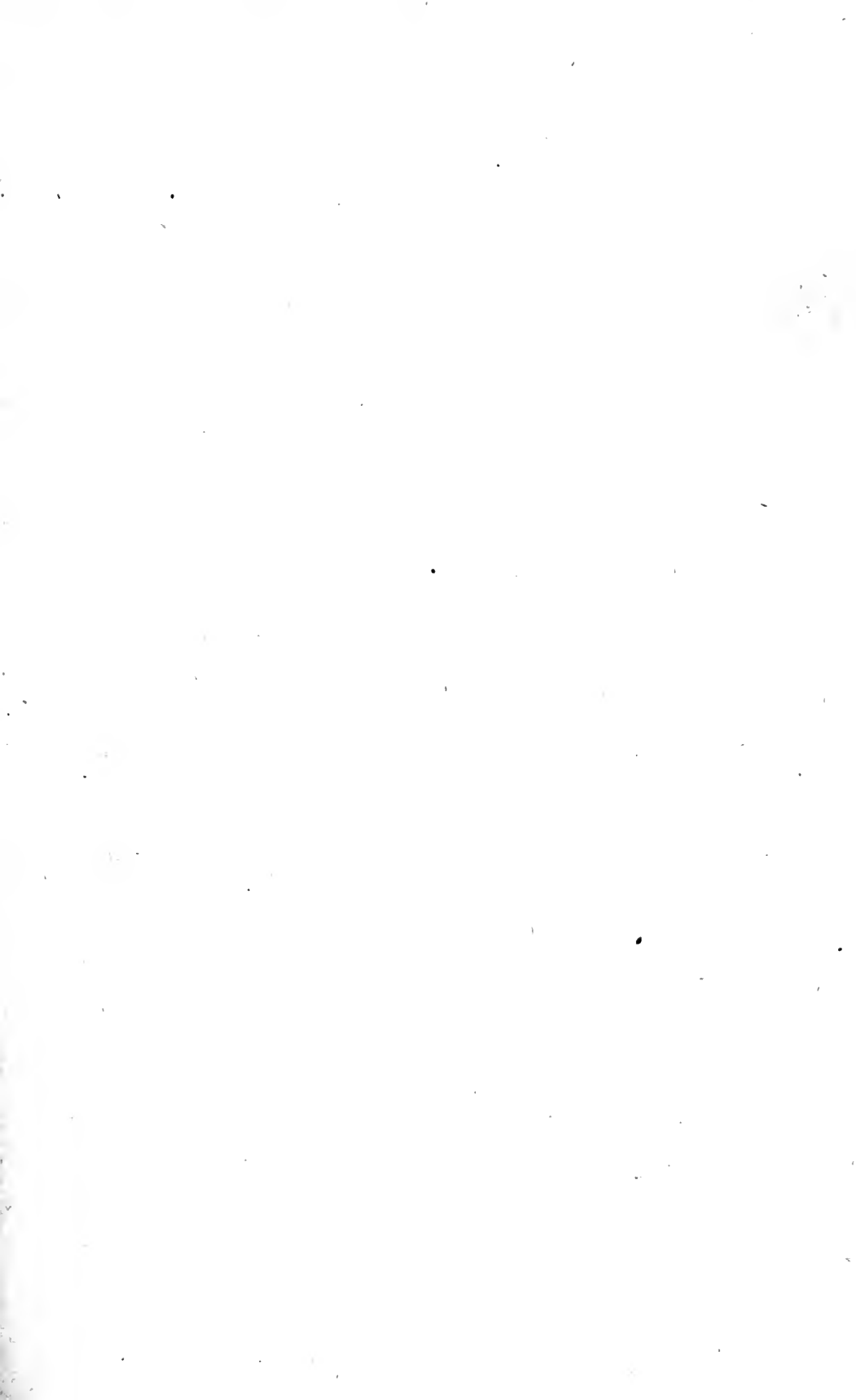
Yellows—Jaundice.

The urinary organs of a pig may become affected and the bile becomes distributed in the system, causing poor action and impure blood.

Symptoms.—Yellow appearance of the pig; poor appetite; sluggishness; poor bowel action and vomiting.

Treatment.—Hot vinegar cloths over the kidneys or hot water containing soda and ginger will be found good.

Give doses of from three to four ounces of linseed oil to open the bowels and from 3 to 6 grains of calomel to keep them open and to act upon the liver.





Florence Forbes

· THE RURAL · EFFICIENCY GUIDE

POULTRY RAISING

BY

FLORENCE FORBES

Member National American Poultry Association
Executive Committee; Secretary-Treasurer
Alabama Branch; First Lady Granted a License
to Judge all Varieties of Poultry; Judge at
San Francisco, Birmingham, Montgomery,
Memphis and many other large shows.

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AUTHORS' PREFACE

THIS book has been written for the purpose of furnishing the farmer and poultry raiser with a convenient and effective source of information by the use of which he may greatly multiply his poultry profits.

Very few realize the magnitude of the poultry industry. There are about 600,000,000 fowls in the United States, or about 100 for each farm. These are valued at about \$250,000,000. The egg production is nearly 2,000,000,000 dozen annually, valued at nearly \$500,000,000. In Canada the poultry is valued at about \$10,000,000 and the annual egg production at about \$20,000,000—an industry second only to the corn crop and one which each year amounts to enough to build two Panama Canals, or nearly \$700,000,000. However, there is an exceedingly large and ever-increasing demand for poultry and poultry products, both at home and abroad, for which reason the poultry business has become so profitable that no farmer can afford to lack the latest knowledge necessary to substantially increase his profits. Of all live stock, the poultry flock is most often poorly cared for and misunderstood. The material used in this book is entirely practical. In its preparation an earnest effort has been made to lay the foundation for a still greater poultry industry.

It is the opinion of the author that if the farmers realized the value of this great industry and the profit in it, when managed in up-to-date methods, they would give the matter far more attention. Surely if every farmer knew that the average hen is only half producing, if he knew that this three-quarter billion dollar industry could, with a little more care and management, be made into a one and a half billion dollar industry, he would feel like doing his part and make his share of the profits.

I have long realized the great need of education among farmers on the scientific breeding, feeding and handling of poultry. The farmer should fully realize that the hen bred for a purpose is just as much a necessity on his farm if he would get the best results from his poultry as is the bacon hog in his pasture or the cow bred for a purpose in his barn; that the pure bred hen is no more subject to disease than the speckled hen of his forefathers. While the latter hen may possibly lay 60 eggs a year, the modern hen bred for egg production will more than double that yield with no more care. Artificial incubation and the scientific selection of breeds adapted to a specific purpose have wrought wonders in the development of the industry.

It has been my aim to gather together the most practical knowledge gained in my own experience and put it in such plain, simple language that everybody would enjoy reading it, and in such a form that the points may be easily found. Although getting a large number of these ideas from my own personal knowledge and experience, I have freely read and consulted the works of other well-known authors, and here I want to acknowledge my indebtedness to the following men for the splendid ideas obtained from their writings: Prof. James E. Rice, of Cornell University, Ithaca, N. Y.; Prof. James Dryden, Jr., of Oregon State Agricultural College, Corvallis, Oregon; E. J. Wortley, E. P. Clayton, of Mississippi State Agricultural College, and Miller Purvis, Sunnycrest Farm, Wendell, Idaho. Besides the works of these authors, I have had access to the leading poultry journals of the country, the splendid information put out by the Government and the International Harvester Company; also that gained from the farmers and poultrymen from all over the United States and Canada. It might be well for me to state to my readers that I answer inquiries every week from poultry raisers all over the country. These inquiries are answered by personal letter as well as through our large papers and journals.

Because of my many years of practical experience on my large poultry farm here at New Decatur, Alabama, where I am now actively engaged in the poultry business, and from the many inquiries I have received from the farmers and poultry raisers all over the country, I have had the opportunity to discover the practical needs of the average poultry raiser. For this reason and on account of the insight into the needs of the industry gained as a judge at many of the largest poultry shows of the country,

PREFACE

as a speaker for the different poultry associations and as a contributor to many of the leading poultry journals, I am perhaps as well qualified to speak upon this subject as any poultry raiser in the country.

It is with the hope that I may not only make the farmers realize the money to be made from poultry when given proper care, but that I may also show them how to make those profits, that I have undertaken the writing of this book. The average farmer will find that by applying the information given in this poultry book it will increase the yearly yield of his flock at least one hundred percent. He will find single recipes that will save him enough to make an excellent profit on the investment if he uses them as I have done in my own experience. If these things are used and prove as beneficial to the farmer and poultry raiser as they have to me, I will feel justly rewarded for my work in getting this information together.

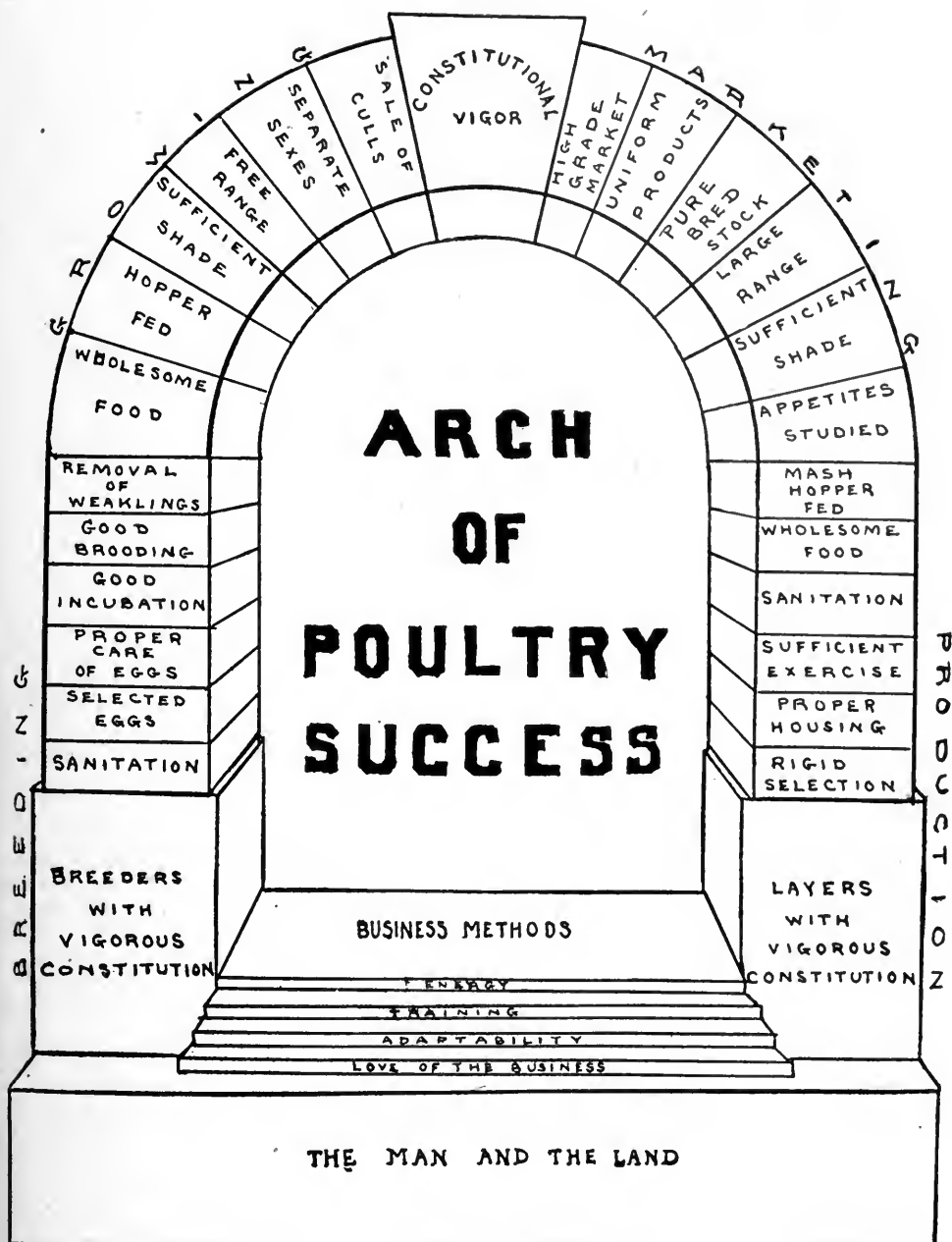
THE AUTHOR.

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Prizes Won by Mrs. Forbes' Poultry at Various Shows.

POULTRY RAISING.

Poultry Crop Exceeds All Others Save Corn, But It
Is Only Half What It Should Be.

CLASSIFICATION OF BREEDS.

General Purpose Breeds.—Plymouth Rocks, Orpingtons, Wyandottes, Javas, Buckeyes, Dominiques, Rhode Island Reds, Cornish, Oregons.

Egg Breeds.—Leghorns, Campines, Anconas, Minorcas, Andalusians, Spanish, Hamburgs.

Meat Breeds.—Cochins, Brahmas, Langshans, Dorkings, Indian Games.

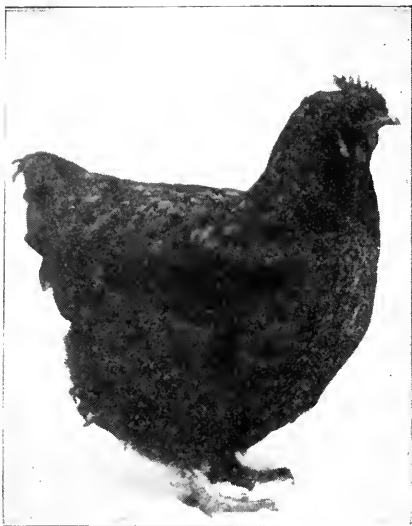
Ornamental Breeds.—Polish, Bantams, Sultans, Silkies.

WEIGHTS IN POUNDS

	Cocks	Cockerels	Hens	Pullets
Leghorns.....	5½	4½	4	3½
Campines.....	6	5	4	3½
Anconas.....	5½	4½	4½	3½
Minorcas (Single-comb Black).....	9	7½	7½	6½
Minorcas (Rose-comb Black, Single-comb White).....	8	6½	6½	5½
Andalusians.....	6	5	5	4
Spanish.....	8	6½	6½	5½
Hamburgs.....	No weights given.			
Cochins.....	11	9	8½	7
Brahma, Light.....	12	10	9½	8
Brahma, Dark.....	11	9	8½	7
Langshans.....	10	8	7	6
Dorkings, White.....	7½	6½	6	5
Dorkings, Silver.....	8	7	6½	5½
Dorkings, Colored.....	9	8	7	6
Indian Games.....	9	7½	6½	5½
Plymouth Rocks.....	9½	8	7½	6½
Orpingtons.....	10	8½	8	7
Wyandottes.....	8½	7½	6½	5½
Javas.....	9½	8	7½	6½
Buckeyes.....	9	8	6	5
Dominiques.....	8	7	6	5
Rhode Island Reds.....	8½	7½	6½	5
Cornish.....	9	7½	6½	5½
Oregons (new).....	Between Leghorns and Plymouth Rocks.			
Bantams.....	Less than two pounds.			

Selection of a Breed.

General Purpose Breeds.—General purpose breeds are of medium size, fairly active, have medium sized combs and wattles and endure cold weather well. The hens of this class can be made to produce a good quality of brown-shelled eggs, and they are usually good setters and mothers. As one has to



Black Orpington Hen.



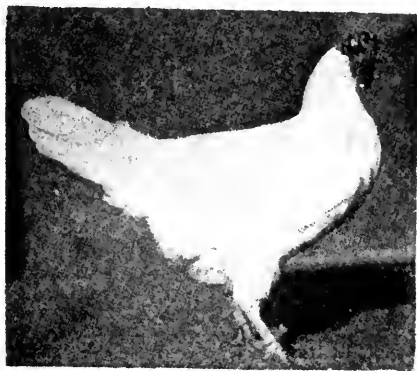
Barred Rock Cockerel.



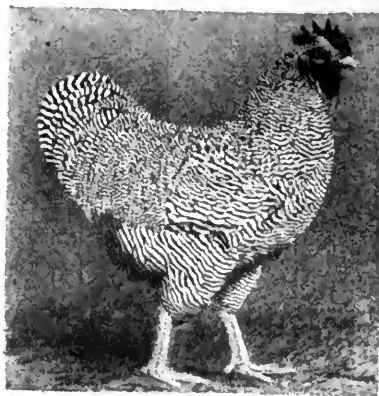
White Leghorn Pullet.



White Leghorn Cockerel.



White Leghorn



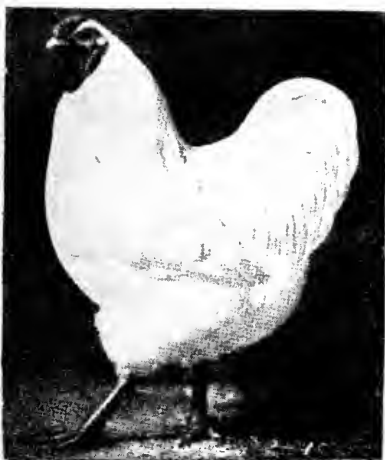
Plymouth Rock



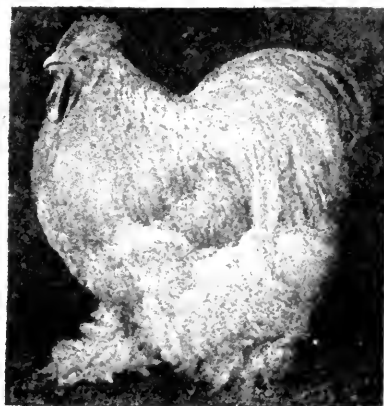
White Orpington



Rhode Island Red



White Wyandotte



Buff Cochin



Langshan.



Light Brahma.



Minorca.



Dorking.



Rosecomb Black Bantams.



Polish.

make frequent sales of flesh in the shape of surplus cockerels and hens, the carcass as well as egg production should be considered, however, it is generally agreed that the egg is of more value commercially than the meat. One of the general purpose breeds is best for the farmer because he usually desires both meat and eggs.

Egg Breeds.—Egg breeds are of small or medium size, have large combs and wattles, very active, ranging through the fields when given their liberty, quick to mature and needing good houses in cold weather, more than the larger breeds. They fatten slowly. The hens often begin laying when but four and one-half months old and when matured produce an abundance of large, white-shelled eggs. They are usually non-setters or at best but poor setters, and rather poor mothers. It is usually necessary to keep a few fowls of some other breed to keep up the stock if natural methods of incubation are employed. Their pure white eggs are valuable for the market.

Meat Breeds.—Meat breeds are large in body and especially suitable for the production of large males. They are domestic, slow and sluggish of movement, with little desire for foraging, easily confined by low fences, quite slow to mature, and will readily take on weight when liberally fed. The hens are persistent setters and rather indifferent layers of large, brown-shelled eggs. This is the kind to handle if meat production for the market is desired.

Ornamental Breeds.—Ornamental breeds as a rule are not as well adapted for farm purposes as the breeds of the other three classes, as they are not highly esteemed for eggs or meat.

Strain More Important Than Breed.—Too much importance must not be attached to the breed, for the breed is not as important as the particular strain. The tendencies of a certain class can be changed by proper breeding. One should breed for the particular result wanted. For instance, a meat breed can be made to increase its laying by proper lineage and careful attention.

Pure Bred Stock Best.—Best results are obtained from pure bred stock for that means a uniformity of products. Pure bred fowls will make a greater profit than mongrels if given the same care and proper marketing is done. You should get stock from some one who has developed a strain bred to lay if it is eggs you want and a strain bred for meat if you desire to market your fowls as a main issue. The average poultryman is not usually very interested in the ornamental points, but the time seems to be coming when utility and fancy will be represented in the same fowls. Utility breeders are taking more interest in fancy points and fancy poultry breeders are taking greater pains in breeding laying strains.

Poultry Houses and Fixtures.

Location.—**Drainage and Southern Exposure.**—Select an elevation with natural drainage away from the building. A gentle slope facing the south is most suitable. Other things being equal, this will be warmer and dryer. If a southern exposure cannot be obtained, a southeastern is preferable to a southwestern. Fowls prefer the morning to the afternoon sun.

Soil.—A dry, porous soil such as sandy or gravelly loam is preferable

to a clay soil. The former is more easily kept in a sanitary condition and drains more readily. If the soil is not naturally dry, it should be made so by a thorough under drainage.

Sunlight and Dryness.—Select a light and dry place. Sunlight is a great germ destroyer. A poultry house should not be built in a hollow where cold air settles.

Temperature.—It is well to build it in the lee of a wind break for protection. Keep the lowest probable temperature in mind as the comfort of the fowls is the main consideration. Depend on ventilation to let the heat escape.

Housing.

Give Hens a Home.—The hen should not be just housed—she should be given a home. Rather than have the building damp, cold, dark or full of mites, it should be clean, light, cheery and comfortable. As Professor Rice of Cornell says: "The singing hen is the laying hen." The hens will not sing unless you keep them comfortable and happy.

Make House Convenient.—Save labor and you save money. Everything that aids you in lessening the amount of labor in caring for your flock will increase your profits. Do not build the house too far away from the other buildings. Make it of easily cleaned material. Have dropping boards, a place for surplus feed, handy nests and a barrel close by for manure. Have dropping boards and roosts readily removable to make cleaning easy—all to save time.

Make House Comfortable.—Allow at least two cubic feet of floor space for each fowl. Never build a poultry house more than seven feet high in front and five feet high in the rear. It must be low to be comfortable for the hens. The hen is a great heat maker. Her temperature averages about 108° and a flock of one hundred hens will throw enough heat from their bodies to keep the temperature safe even if the thermometer goes below zero.

Make House Light and Dry.—Let plenty of sunlight in the house as it is the best germ destroyer in the world and poultry will not do well if housed in dark, gloomy quarters. Have a good ventilating system and dry floor to make the house dry and comfortable. Have the floor higher than the ground surrounding it. If a house is built warmly and has a glass front, it gets hot during the day and cools off quickly at night. Such a house is always damp because there is no circulation of air to dry out the moisture which condenses on the walls. The partial open front house is conceded to be the best for most sections. Cold does not hurt hens but they are injured by sudden changes of temperature. If the thermometer drops below zero, muslin curtains can be stretched across the open windows to prevent the hens freezing their combs. Such curtains keep out cold, snow and wind but permit the air to pass through, keeping the house dry. When muslin is used, allow one square foot of muslin placed on the south side to every 15 square feet of floor space in houses of 15 feet in width. If the house is ten feet wide, use one square foot of muslin

to 20 feet of floor space. In houses 20 feet in width allow one square foot of muslin to every 10 square feet of floor space.

Keep House Ventilated but Prevent Drafts.—Fresh air is good for hens but drafts are injurious. Remember that chickens cannot endure sudden changes and easily catch colds. An open front poultry house, with the north, east and west sides closed prevent drafts and furnish plenty of good fresh air.



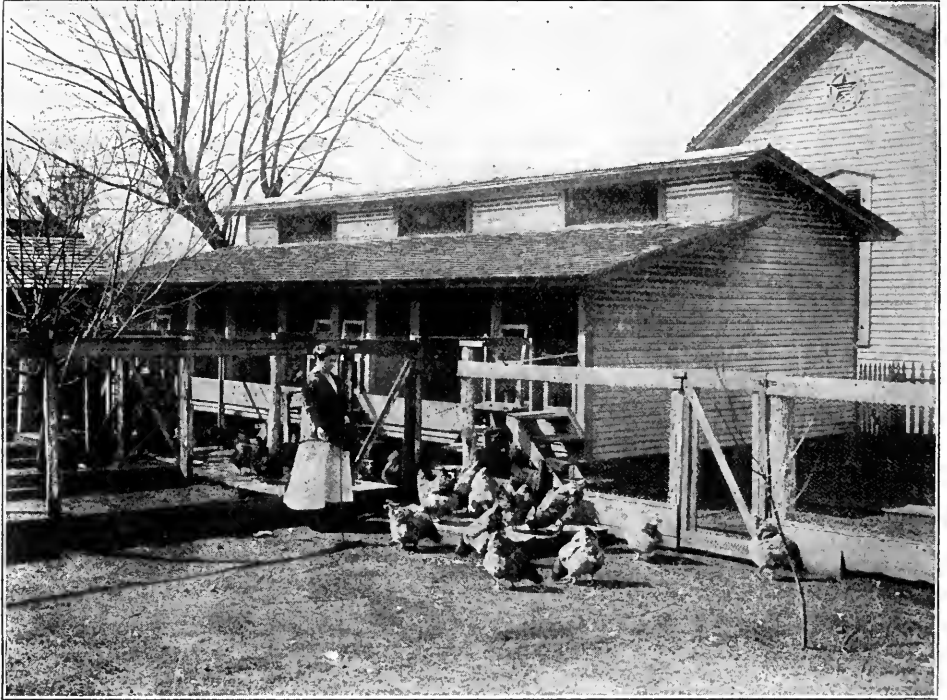
Poultry Yards.

Keep House Clean.—To have the house sanitary and cheerful, it must be kept clean. Have boards to catch the manure at night, keep clean litter on the floor and clean the chicken coop thoroughly at least once a month. Clean the dropping board at least once a week in summer.* If a dirt floor is used, remove the litter often enough to keep it dry and clean. If one gets the habit of cleanliness he need have no fear from poultry diseases.

*An earth floor is best. Earth itself is a disinfectant. The floor should be raised above the outside surface by putting in other dirt and packing it down well. Bricks may be used around the lower outside to make a wall to retain the extra dirt in real cold climates. A half-inch mesh of steel wire under the dirt makes best guard against rats. Concrete floors are not desirable as they are nearly always damp.

Keep the House Free From Vermin.—Keep the poultry house clean and it will not be infested with lice and mites. Cover the nests and roosts with kerosene or kerosene emulsion once a month during the spring and summer to eliminate them. The best preventatives are sunlight and cleanliness.

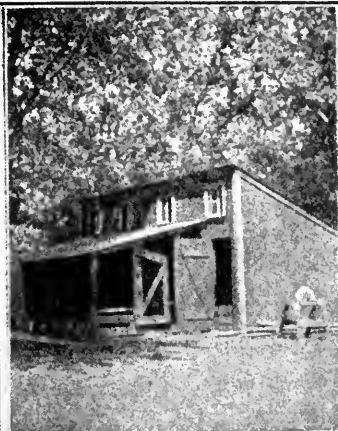
House Need Not Be Expensive to Be Good.—A good house does not necessarily mean an expensive house. A shed made of posts with straw for sides makes a good house but this kind is hard to keep clean.



The Open Front Poultry House.

Keep These Things in Mind in Housing.

1. **Floor Space.**—Two to five square feet of floor space should be allowed per fowl.
2. **Fresh Air.**—Fresh air should be secured by ventilation rather than by increasing the amount of cubic air space thus giving more space than necessary for the convenience of the attendant.
3. **Intensive vs. Colony System.**—More birds can be kept per floor area under the colony than on the intensive system in mild climates where the hens have free range throughout the year.



A Well-Constructed Poultry House



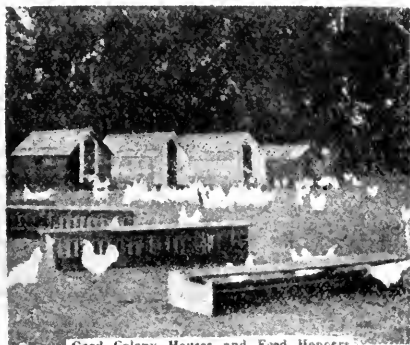
Open Front Poultry House. The Poultry House is the Home of the Hen



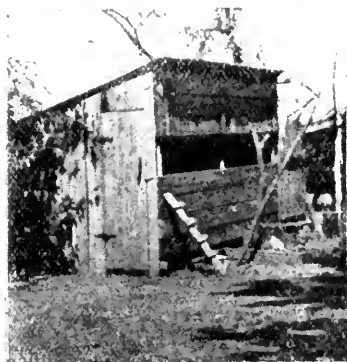
Dry Mash Feed Hopper For Chicks—Wire Is Removable, Allowing Ease of Cleaning



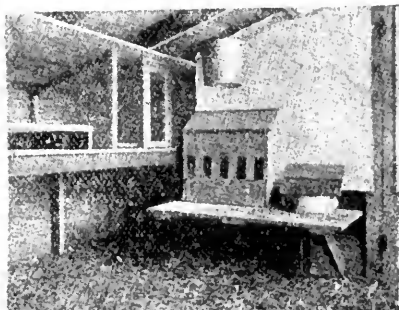
Colony Houses



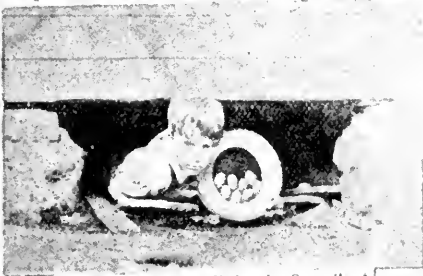
Good Colony Houses and Feed Hoppers



An Inexpensive Practical Farm Poultry House



Interior of Poultry House Showing Platform on Which Are Placed All Feed And Drinking Vessels. This Keeps Everything Up Off The Floor, Insures Cleanliness And Prevents Wasting



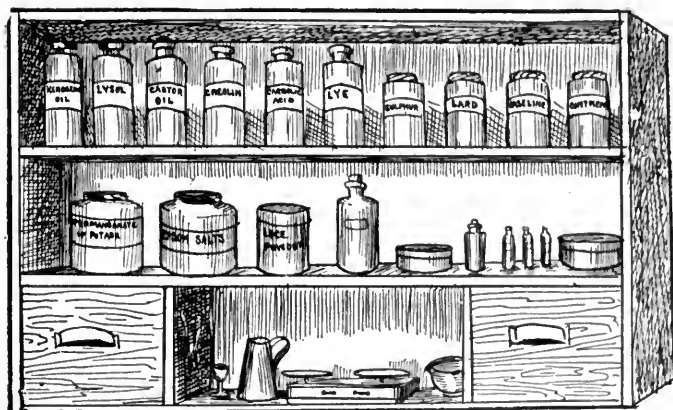
Gathering Eggs From Under the Corner—A Poor System

4. **Open-Front House.**—The partial open-front house is granted first place as the best for most sections. (See illustration.)
5. **Colony Plan.**—The colony plan is very good for many farms as it does away with the danger of tainted soils. (See illustration.)
6. **Roosts.**—Roosts should be built on the same level, two feet six inches from the floor with a dropping board eight inches below them.
7. **Material for Roosts.**—Good roosts may be made of 2 x 2 inch material.
8. **Nests.**—Nests may be placed on the side walls under the dropping boards.
9. **Darkened Nests.**—It is best to have the nests darkened. Hens prefer a secluded place to lay.
10. **Cracks and Crevices.**—No cracks and crevices should be left for vermin.
11. **Rats.**—Prevent them from getting in by sinking a wire netting all around the poultry house. Dig a foot ditch around the house and line the inside bank with wire netting, one inch mesh, one foot wide, and replace the earth. The wire should be wide enough to reach one foot below the lower edge of the wall if the house stands off the ground. The use of a brick, stone or cement foundation sunk one foot into the ground will prevent rats from getting in when an earthen floor is used.
12. **Earthen Floor.**—If the location is dry an earthen floor is better than any other.
13. **Board Floor.**—A board floor is better than an earthen one if the location is damp. If used, build high enough to permit the air to freely circulate beneath.
14. **Walls.**—Use a double wall on the north and west sides if the climate is severe.

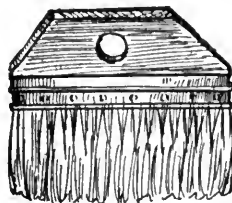
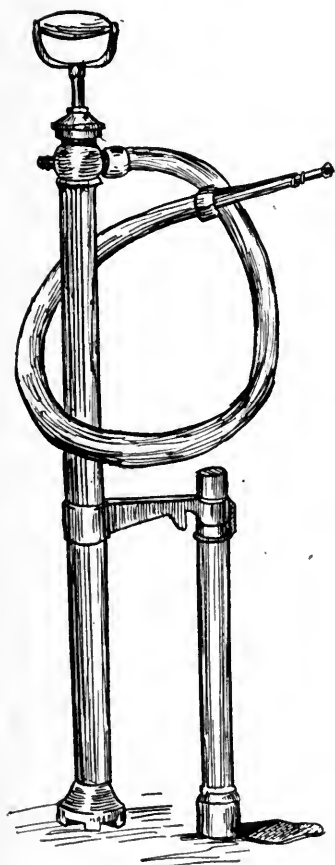
Points on Cleaning a Poultry House.

Not every poultryman of experience even, knows how to really clean a poultry house. The first thing to do is to remove all the litter and loose dirt which can be shoveled out. Then give the floor, walls and ceiling a thorough sweeping and shovel out the accumulated debris. Next play a garden hose, with the maximum water pressure which can be obtained, upon floor, roosting boards, walls and ceiling, until all the dirt which can be washed down easily is disposed of. Then take a heavy hoe or roost-board scraper and proceed to scrape the floor and roosting boards clean of the trampled and caked dressing and dirt. Shovel out what has been accumulated and get the hose into action once more and wash the whole place down again thoroughly and follow this with another scraping.

Next, with a stiff-bristled broom thoroughly scrub walls, floors, nest boxes, roost boards, etc. After another rinsing down and cleaning out of ac-



Poultryman's Medicine Cabinet.



Handy articles for thorough disinfection.

accumulated dirt, let the house dry out for a day or two. Then make a searching inspection to see if any dirt can be discovered. If so, apply the appropriate treatment as outlined above. If, however, everything appears to be clean, the time has come to make it really and truly clean by disinfecting. To do this it is necessary to spray all parts of the house or thoroughly wash with a scrub-brush. Wet with a good disinfectant. This should be done at least twice, allowing time between for it to dry.

How to Disinfect a Poultry House.

First. See that the house is perfectly clean by following faithfully the instructions given above. Where the garden hose is not available, use instead a broom or a scrubbing brush.

Second. Fumigate. Before fumigating it will be necessary to provide accommodations for the fowls. Usually these operations take place during mild weather, when it will not hurt the birds to be shut out of the house for eight to ten hours. The closing up need not be done until along towards noon when most of the laying is over with. Should there be other houses, shed or coops into which the hens can go to lay, the fumigating can be done at any time.

In case the disinfecting is done during cold weather, extra precaution should be taken in caring for the hens. If they are laying, do not expose them to sudden changes. Usually, however, when conditions are such that it is necessary to do this house-cleaning in the winter time, very few eggs are forthcoming and it is not a question of keeping up the egg yield, but of getting the house properly disinfected. When the hens are removed, close up the house as tight as possible and light sulphur candles. Let them burn four or five hours or until they are exhausted. The house then can be opened and in half an hour the rest of the disinfectant should be finished.

Third. Thoroughly disinfect by the use of good lice paint, applied with a brush or sprayer. Paint the roosts, drop boards and nests very thoroughly. Be sure the liquid gets into all the cracks and joints of the roosts. Miss no place where the fowls go or where the insects may hide. Follow this with some of the good, coal-tar preparations sprayed over the entire surface of the inside of the house. Take pains to get into every corner.

Now that the house is clean, this spray should be used once a week throughout the summer and once a fortnight during the winter. To do this is important, because it is a simple matter to keep a poultry house clean after it has once been thoroughly cleaned and properly disinfected.

Fourth. To make a complete job, follow the foregoing treatment with a whitewash brush and your house will be as clean and healthful as hands can make it. The whitewashing will depend upon the time of the year and the accommodations for the fowls, but if possible have it done before they are allowed to enter the house again. A good whitewash, one that will stick and not rub off, is made as follows, or in these proportions:

U. S. Government Whitewash.

Unslaked lime	2 pecks
Common salt.....	1 peck
Rice flour.....	3 lbs.
Spanish whiting.....	½ lb.
Glue	1 lb.
Water	Sufficient quantity

The quantities given are sufficient to make nine or ten gallons of whitewash. If only part of the whitewash is needed, the balance can be kept for future use. Should a smaller quantity be desired, the proportions can be cut down to suit.

Directions.—To properly make the amount of whitewash above mentioned, two vessels are needed, one holding at least ten gallons and the other holding half as much. A small barrel and a tub or any water-tight vessel will answer very well.

1. Slake the lime in the barrel, using two or three gallons of water for two pecks of lime. 2. Cover the barrel. 3. Dissolve the salt in water, strain the brine and add it to the slaked lime in the barrel. 4. Boil the rice flour for ten minutes in a small quantity of water. 5. Dissolve the glue in a double cooker or water bath and avoid scorching. 6. In the tub mix the whiting with about five gallons of hot water. 7. Add to the whiting mixture in tub the boiled rice and dissolved glue. Mix thoroughly. 8. Pour mixture in tub into the barrel containing slaked lime, stir well until thoroughly mixed. 9. Cover barrel to protect from dirt and let whitewash stand for a few days, when it will be ready for use. 10. This whitewash should be applied hot if best results are to be obtained. Heat it in any kettle or other metal vessel on a stove or suspended over a fire.

Fifth. Before allowing the fowls to return to the clean house they themselves should be made clean by a thorough treatment for lice. It is a good plan to go over them with some good insect powder or powdered sulphur before removing them from the house and again on putting them back. Dust the powder well into the feathers of every one and allow no sickly birds to enter the clean house.

A first class lice powder can be made by mixing 5 parts of Naphthalene flakes with 95 parts of some good carrier such as a cheap talcum powder that can be purchased for 5 to 10 cents a pound.

Sixth. Remove and destroy all wooden feed troughs, and provide new ones. If these are made of galvanized iron they can be kept clean with little trouble. Galvanized or earthenware drinking vessels must be thoroughly cleaned by scalding and scouring. If the old ones are not in perfect condition it is much better to destroy them and to provide new.

Disinfectants.

Creoline, naphthos and zenoleum are good disinfectants and germicides, each having a carbolic acid odor.

Whitewashes.

Whitewash is the cheapest of all paints and may be used for interior or exterior surfaces. It can be made as follows:

1. Slake about ten pounds of quicklime in a pail with two gallons of boiling water. Cover the pail with burlap or cloth and allow it to slake one hour. Add enough water to bring the whitewash to a consistency which may be readily applied. Adding four ounces of carbolic acid to each gallon of whitewash increases its disinfecting power.

2. Whitewash for exterior surfaces (waterproof):

First. Slake one bushel of quicklime in twelve gallons of hot water.

Second. Dissolve two pounds of common salt and one pound of sulphate of zinc in two gallons of boiling water. Pour second solution into first, then add two gallons of skim milk and mix thoroughly.

Poultry Droppings.

Poultry droppings are very good fertilizer as they are rich in sulphate ammonia, kainit and high grade acid phosphate. One hundred birds running at large on an acre should have added, in six months, to its fertility the equivalent of at least one hundred pounds of high grade acid phosphate, two hundred pounds of sulphate of ammonia, and sixty pounds of kainit. The droppings should be saved during the winter. Twenty-five hens will produce in six months three hundred seventy-five pounds of fertilizer from the roost droppings alone. As a top dressing for grass, poultry droppings are exceedingly valuable because they contain a large amount of nitrogen in the form of ammonia compounds which are nearly as quick in their action as nitrate of soda. However, droppings must be taken care of if they retain their value because the gaseous contents soon escape. There are several chemicals, each of fertilizing value in themselves, which can be added to the droppings now and then with good effect, both in making the air of the henhouse more wholesome and in stopping waste. They are: gypsum or land plaster, kainit, cheap potash salt, acid phosphate. Each one of these chemicals forms a compound with the ammonia as fast as it is set free from the original combination. Plaster often forms a lumpy, dry mixture if used in large enough quantities to stop the ammonia but kainit and acid phosphate make a moist, sticky mass. Never use wood ashes or slaked lime as neither of these combine with the ammonia but forces it out of its compounds and takes its place. It is also well to add dry meadow muck or sawdust besides the chemicals. It would require about one-half peck of either of these absorbents besides about eight pounds of acid phosphate or kainit to the weekly droppings of twenty-five hens when scraped from the roosting platforms. In case one desired a balanced fertilizer for corn or some other hoed crop, he could use equal parts of acid phosphate and kainit instead of either alone.

EGG PRODUCTION.

(Farmers Lose \$45,000,000 Annually From Bad Methods of Producing and Handling Eggs.)

The Five "G's" in Egg Production.—Grains, greens, grubs, grit and gumption—these mean egg production.

Produce Infertile Eggs.

Fertile Eggs Spoil Easily.—Fertile eggs cause a \$15,000,000 loss every year in the United States alone. They spoil quickly. A fertile egg contains the germ from which a chick develops. This development starts whenever the temperature is above 70 degrees. Fertile eggs cause "blood rings" and "black rot" which spoils them for market.

To Prevent Loss Dispose of Roosters.—The rooster does not help the hens to lay. He merely fertilizes the germ of the egg. It is not necessary to keep a male bird in order to produce eggs. Hens lay just as many, if not more eggs when there is no male in the flock. To have good eggs in hot weather for food and market, kill the roosters as soon as the breeding season is over.

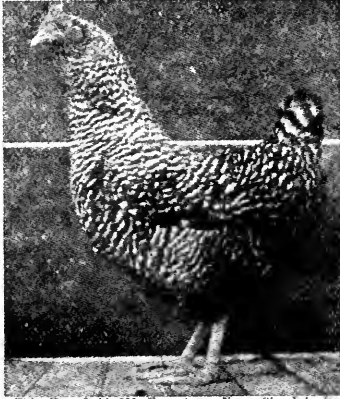
Breeding for Egg Production.—The strain is more important than the breed. A pullet from a strain not bred to lay will not be a good layer no matter how well fed she is. One must develop a laying strain. Select your stock from a strain bred to lay. Select your stock from breeders of known excellence as layers. Also look to the male bird. A rooster that has come from parents of medium production can not produce a high producing individual when crossed with even the best of hens. The early maturing stock will contain the high producing bird.

Improve Your Flock.—Cull out the weaklings and the poor layers.

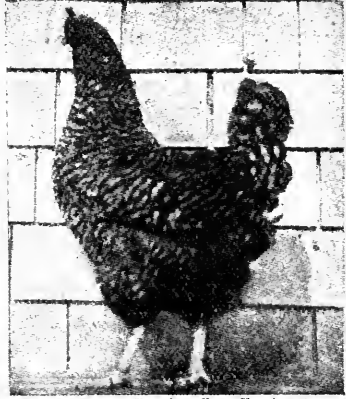
Cull Out the Old Hens.—It is seldom profitable to keep hens for laying after they are two and one-half years old. Not that they will stop yielding profit but younger fowls will yield a greater profit. Many poultrymen who make a specialty of winter egg production keep nothing but pullets. They dispose of the one-year-old hens before it is time to put them into winter quarters.

Time Breeds Begin Laying.—Yearling hens will not begin laying much before January first and older hens not until later. November and December eggs bring the high prices. Laying breeds should begin laying when about five months old; general purpose breeds when about six months and the meat breeds at seven or eight months.

How to Select a Laying Hen.—A good laying hen has bright eyes, the comb is bright red and larger than the average of her breed; neck is long; the breast is broad and somewhat receding from top to bottom; the back is long and wider at the hips than shoulders; she has a deep abdomen; the lower line being lower than the lower line of the breast; legs are wide



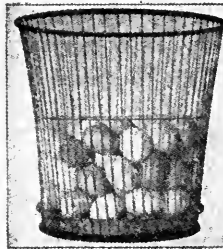
This Hen Laid 231 Eggs in a Year—She Inherits Her Laying Quality From Her Ancestors



This Hen Laid 8 Eggs in a Year—Her Ancestors Were Poor Laying Stock



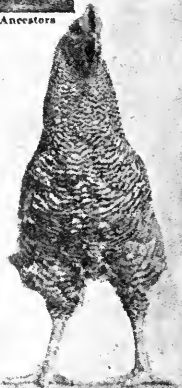
A Young Male of Weak Vitality. Note Narrowness of Body and Tendency Towards Knock Knees



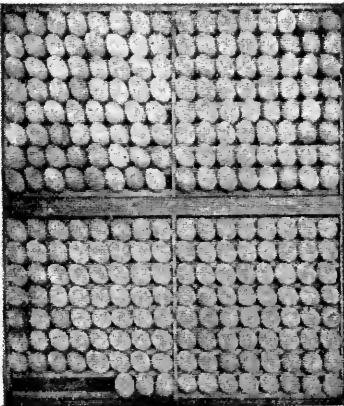
60 EGGS—What the Average Farm Hen Produces



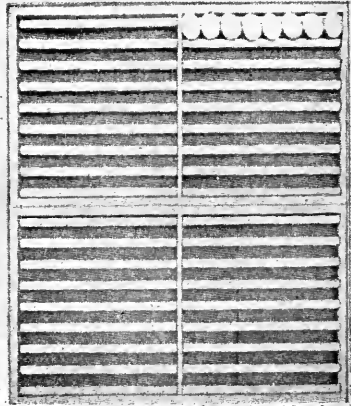
120 EGGS—What She Should Produce



A Young Male With Strong Vigor. Note Width of Breast and Spread of Legs



Annual Yield of One Hen, Selected From a Laying Family



Total Annual Production of One Hen, Selected From Poor Stock

apart and the tail well spread. Examine the pelvic bones. These are the two rather pointed bones which can be felt in the rear of the hen's body just below and at each side of the vent. The pelvic bones of a good layer are wide apart. If the points of these bones are close together the hen is not laying and she is probably not a good layer. The hen may be considered a good layer if three fingers can be laid between the points of these bones. A good layer shows the pelvic bones well apart even when not in full lay. When the bones are close together and difficult to press apart, the hen is generally a very poor layer. High producing hens molt late, they have pale shanks at the end of the laying season and are heavy eaters.

Bad Traits Are Inherited.—While the chickens are maturing and their distinguishing characteristics are asserting themselves, be on the lookout for bad characteristics and weed out the undesirables. The bully is pressing a tendency that was born in her. She interferes with the contentment of the flock and keeps up a continual state of excitement. This affects the laying and health of the other hens and she should be dealt with drastically.

No Extra Roosters.—Extra roosters take room and feed and yield no profits. Sell or kill them. The hens will lay just as well, or better, without them.

Keep One Breed.—A uniform breed means uniform products and uniform products bring better prices. Such a flock is easier to tend. It is more attractive and you will give it better attention. Breed from the best you have.

Feeding for Egg Production.—The problem of feeding is of great importance. It should be considered carefully for not only the general health of the birds, but also the economy which promotes success depends upon it to a large extent. This subject should be studied with common sense for there are no hard and fast rules which apply to every case. One should consider the general environment and price of feeds in determining the rations. Hens must be given balanced rations if they produce results. If the ration is properly balanced the hens will make a good profit, but if the ration is improperly balanced they will be kept at a loss. If the hen has considerable range, grain is all that need be supplied during the summer months. In the winter, and also if confined in summer, everything must be provided. It is false economy to expect them to pick their living from the leavings of other stock. Many farmers admit that they feed their hens nothing during the summer. In so doing, they are saving feed but losing money. A productive hen requires from 70 to 80 pounds of feed a year. If she gets only 40 or 50 pounds, she will simply satisfy her body requirements. She will not lay eggs. The scantily fed hen is a poor investment.

The nutriment in the feed of laying hens serves two purposes; first, to furnish heat to the body and repair waste; second, to supply the egg-making materials. Only the surplus over what is needed for the body is used for egg production so it is important to feed in sufficient quantities to induce this production. To produce eggs one must have healthy vigorous stock, and feed the material from which eggs are made.

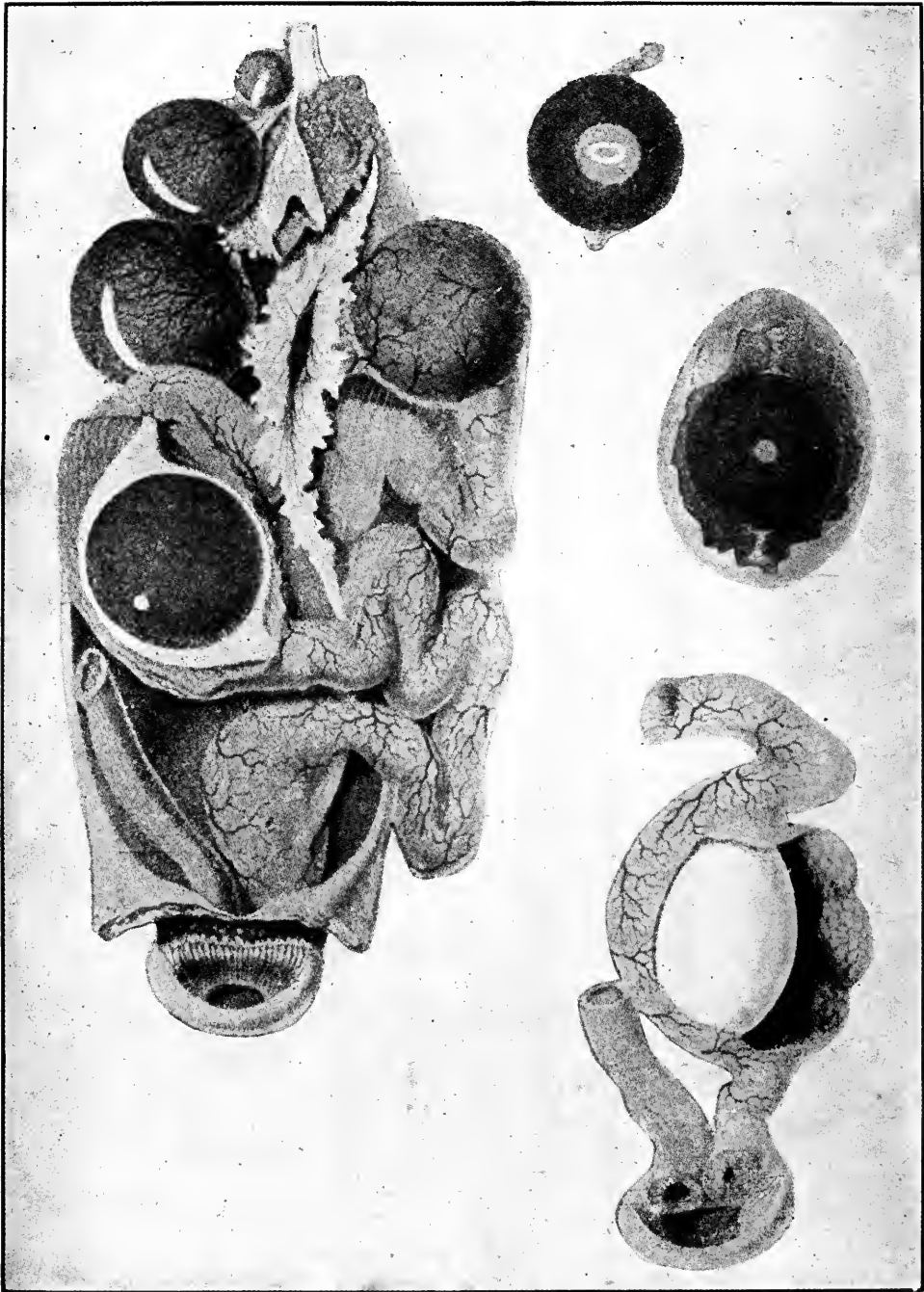


TABLE OF FEEDS

Provided by Nature	Classification	Fed by Poultrymen
Worms and bugs.	Protein or nitrogenous material.	Meat (beef scrap or green cut bone), eggs, cottage cheese, milk (skim, sour, butter-milk).
Greens.	Succulents.	Cabbage, sprouted oats, mangels, clover, alfalfa, lettuce, kale, beets, turnips, potatoes, etc.
Seeds.	Nonnitrogenous.	Grains, such as corn, wheat, buckwheat, oats, barley, etc.
Grit.	Mineral matter.	Grit, oyster shell, old mortar, fine gravel, etc.
Water.	Water.	Water.

What It Takes to Make an Egg.—An egg is about 74 percent water, 15 percent protein, 10 percent fat and 10 percent mineral matter.

Plenty of Water.—Since 74 percent of an egg is water, it is very necessary to keep plenty of good, clean water before the hens at all times. Running water is best but if this is not available, keep the water in vessels fresh.

Antiseptic in Water.—It is sometimes well to add enough permanganate of potash to make it a wine red. This will act as an antiseptic in preventing the transmission of disease through the water and will help keep down intestinal parasites.

Keep Water Warm in Winter.—In winter, as in summer, the first thing a fowl does when it leaves the roost is to hunt the water pan, and nearly the last thing before going on the roost is to drink. If the water is icy cold they will not drink much, but if warm, they will drink plentifully. If the weather is freezing, warm the water several times a day.

Keep Water Clean.—There are several ways of keeping the water clean. One way is to punch three or four nail holes near the top of a syrup bucket or tin can, fill the can or bucket with water and turn it upside down in a shallow pan or saucer. The water oozes out no faster than the chickens drink it and is always fresh and clean. (See illustration for other schemes for keeping water clean).

Protein.—Protein is the most costly but the most valuable part of any ration. It is that material in feed which goes to make nerve cells, brain matter, tendons, skin, feathers, claws, beaks, intestines, vital organs, and, when combined with lime, bones and muscle. It is found in the animal feeds such as: buttermilk or sour skim milk, beef scrap, ground bone, cut bone or wild game, some legume such as clover or alfalfa leaves, insects and bugs during the summer, offals from butchering. One need exclude no animal food from the ration. Hens relish and make good use of all of them. Feed them raw, when possible, unless they are from an infected animal. Better results are obtained by using cheap fats like beef scrap than by feeding higher priced

animal meats. Beef scraps make an exceedingly cheap source of food for chickens and should be bought when they can be had at reasonable prices.

Alfalfa.—It has been found by the Utah Experiment Station that alfalfa (lucerne leaves) fed in winter has the same effect on the eggs that grass has during the spring and summer, that is, it gives the yolk the natural rich orange color. It is a fine winter feed.

Skim Milk.—Skim milk contains a great deal of protein. When given to the birds either as a drink or in the form of a wet mash, it will double the egg yields, according to the Nebraska Experiment Station. Let it sour before feeding as sour milk keeps the hens healthy. It may be given as a drink, compounded with beef scraps or animal meal, or it may be mixed with ground grain or meal. When added to a meal mixture use about two pounds of milk to one of meal. The most economical gains are made in chickens when skim milk is fed both ways, i. e., as a drink and added to the grain mixture. Skim milk is also perhaps the best food for producing the desirable white skin in chickens. (Commercial meat scrap is of equal value and may be substituted when milk cannot be obtained).

Insects and Bugs.—In the summer the hens get protein by eating insects, bugs, grasshoppers and such things. During the winter months they must be given feeds to take the place of these, such as: cut bone, meat scraps and animal meal. The scraps and meal may be mixed with the mash but green cut bone is usually fed by itself. Feed one-half to three-quarter pounds of meal or meat scrap to twelve to fifteen hens.

Cut Bone.—Hens under like conditions, with fresh cut, green bone added to their feed, will lay nearly twice as many eggs in the winter season and a third more right in the summer season than they will without it. Cut bone is fresh bone shaved into thin pieces by a bone cutter. If the bone has considerable meat on it all the better for the meat and bone together is excellent for producing eggs. Cut bone must be obtained regularly as it cannot be kept sweet long. If it is not sweet, bowel trouble may result. When first beginning to feed, give one-half pound to twenty hens, then double the amount. Meat is likely to be loosening to the bowels at first so the hens should be watched carefully and not fed too much. When they are used to it it may be kept constantly before them.

Fats.—Ten percent of an egg is fat. Fat is made from starch. Grains contain a great deal of starch, especially corn. Wheat, milo, sorghum, buckwheat, are also fat-producing foods.

Corn.—Chickens can readily digest corn whether fed cracked or whole or as corn meal and whether fed moist or dry. If the grain is finely ground it is usually best to moisten it before feeding. Corn is fattening and heating. If too much is fed it will produce fat instead of eggs. It should be balanced with linseed meal, bone, meat, gluten, and nitrogenous feeds, for corn is deficient in nitrogen. If corn is fed to hens having plenty of exercise, that secure insects and green feed, much more satisfactory results will be obtained than when it is fed to the same fowls closely confined. It may be fed largely in

cold climates during winter, but should not be fed much during the summer. One should be careful not to feed enough corn to make the hens too fat as they will become lazy and will not lay eggs.

Wheat.—Wheat is believed to be the safest grain to feed alone. It is too fattening when fed alone but not as fattening as corn. When this grain is fed it should be supplemented by some skim milk or meat feed to increase the amount of protein. Wheat is not as valuable for fattening as corn but is much better for growth.

Mineral Matter.—The 10 percent of mineral matter of an egg is lime. This is used for the shell. Hens can usually get enough lime in the sand and grit they pick up in the summer to supply themselves during that time, but in winter this element must be supplied. Crushed oyster shell, crushed bone, ground rock, sand, old mortar and fine gravel all supply lime. One of these elements should be kept where the hens have access to it at all times. Crushed bone is generally believed to be the best and oyster shell to be the most undesirable as it seems to injure the alimentary tract of the fowls. Feeding ground rock, ground bone or sand does not do this.

Green Feed.—Hens must have green feed to keep them healthy and in good condition and to make them lay. When the ground is covered with snow, green feed must be given them. Anything that is relished by the fowls is good. Cooked potatoes, cooked turnips, beets, cabbages, steamed clover, or alfalfa hay are fine for this purpose. In feeding vegetables hang them up high enough to make the hens jump for them. Exercise is good for laying hens.

Sprouted Oats.—As a protein or egg-producing feed, oats rank much higher than corn and contain more fat than wheat. Its high proportion of hull to kernel makes it bulky and unpalatable. Sprouting overcomes this difficulty, and also furnishes the green feed so essential. Oats can be sprouted and fed at 4 to 6 inches high more economically than roots or vegetables can be produced. The time required for the growth is short, the amount of succulent or green material is large and increased egg production is invariably the result. One hundred pounds of oats can be increased to 350 or 400 pounds of succulent feed.

Oat-Sprouting Cabinet.—Cabinet is thirty inches square and five feet high. Wooden trays two inches deep and thirty inches square are made to fit this rack and slide in and out on cleats nailed to each side of rack. Cleats are placed about eight or ten inches apart. Gimlet holes are bored in the bottom of each tray to drain off the water. Rack is placed in basement or cellar. Oats are soaked over night and the next morning they are spread out on the trays about one and one half inches deep. The oats are sprinkled each day. No artificial heat is used so there is no trouble from mold. In any case this can be avoided by stirring them on the second day. Oats are ready for use in about six days. This is a cheap and easy way to supply green winter feed. (See illustration.)

Miscellaneous Feeds.—(See "Mustard." Learn about its egg-producing qualities.)

Variety is Important.—A hen likes variety and if she does not have it she will not lay eggs. Grain alone is not sufficient. She must be given different kinds of feeds so that she will relish each kind.

Egg Rations.

Ration 1.

Scratch Food.

In Winter—

- 1 part wheat
- 2 parts corn

In Summer—

- 2 parts wheat
- 1 part corn

Mash (ground food).

- 1 part bran
- 1 part middlings (shorts)
- 1 part cornmeal
- 1 part commercial beef scrap.

Ration 2.

Scratch Food.

In Summer—

- 1 part corn
- 2 parts wheat

In Winter—

- 2 parts corn
- 1 part wheat

Mash.

Ground oats

Buttermilk or sour skim milk as a drink.

Ration 3.

Scratch Food.

In Winter—

- 6 parts wheat
- 3 parts corn
- 3 parts oats
- 3 parts buckwheat

In Summer—

- 6 parts wheat
- 6 parts corn
- 3 parts oats

Mash (ground food).

- 6 parts cornmeal
- 6 parts middlings
- 3 parts bran
- 1 part alfalfa meal
- 1 part oil meal
- 5 parts beef scrap.

Ration 4.

Scratch Food.

Early morning and night cracked corn.
At noon equal parts wheat and oats.

Mash.

- 3 parts bran
- 1 part middlings
- 1 part corn meal
- 1 part meat scrap
- Occasionally 1 part oil meal is added to this ration.

Ration 5.**Scratch Food.****Mash.**

In Summer—	4 parts bran
1 part corn	8 parts shorts
2 parts wheat	8 parts corn meal
In Winter—	8 parts ground oats
1 part corn	8 parts beef scrap
1 part wheat	4 parts gluten meal
	1 part oil meal

Ration 6.**Scratch Food.****Mash.**

6 parts corn	2 parts bran
6 parts wheat	1 part corn meal
4 parts oats	1 part gluten meal
2 parts barley	1 part ground oats
1 part kafir corn	1 part middlings
1 part buckwheat	1 part beef scrap.

Ration 7.

For the production of eggs, the Mississippi Experiment Station recommends the following ration:

Cotton seed meal.....	25 Parts
Corn meal	30 Parts
Wheat bran	30 Parts
Wheat shorts	15 Parts

A little salt may be put into this ration; one pound to the hundred, is advisable.

This mash should be put into clean, dry hoppers in dry sheds. If the mash is dry, the hens will not eat too much of it. They should have access to it at all times.

A grain mixture also should be given the laying hens. This mixture may well be:

Corn	2 Parts
Wheat	2 Parts
Oats	1 Part

HOW TO MAKE HENS LAY IN WINTER.

(Practical Suggestions Gathered from the Best Poultry Raisers in the World.)

To have winter eggs, duplicate spring conditions. Give the hens a home. Depend on pullets for winter egg production.

House the hens properly. Have an open front poultry house facing the south. Have plenty of ventilation but prevent drafts.

Supply a nest for every four or five hens. Keep the nests clean and free from vermin.

Gather the eggs regularly—at least once each day.

Give the hens a dust bath. Laying hens must have their morning dust bath if they are to lay the maximum number of eggs through the winter. It is a necessary luxury for them. By its use they are enabled to rid themselves of mites and to remove all scales and dirt from the skin. Lice and mites do their greatest injury to the fowls at night, while on the roost. Instinctively they look for a place to dust in the morning. Do not force the hens to dust in the droppings or feed litter. During the summer they usually find their own dusting place such as the road or in the shade of trees and shrubbery, but in winter it must be provided for them. Nail an old grocery box in one corner of the house. Elevate it above the floor so that it will not become filled with straw or litter and put in six or eight inches of dusting material. A little slaked lime added to it would not hurt anything.

Give the hens some ground mustard in their feed if they are not laying. It will work like magic. Look up "mustard" for feeding.

Feed a mash once a day. The afternoon is a good time to feed it

Provide plenty of grit and ground oyster shells.

Feed about three pounds of succulent food, such as sprouted oats, daily.

Do not allow birds out of their house when there is snow on the ground.

Feed balanced rations, those carrying the proper proportion of protein, carbohydrates and fats.

Feed evenly and regularly, not a feast today and a famine tomorrow.

Feed scratch grains morning and evening. Scatter the grain in the litter. Birds need exercise.

Provide fresh, warm drinking water. Clean the water dishes every day.

Nests.

It is believed that there is no other one factor which contributes to the great total of bad eggs so much as poor nests. On most farms there are only about eleven nests for one hundred hens and these nests are improperly located and dirty. Such a situation means that 50% of the fowls must seek nests for themselves. This 50% usually seek places under the corn crib, straw stack, in the horse stable or out in the weeds, and these are the very places where there is an abundance of vigorous bacterial growth flourishing upon the moisture and warmth. As a result, when a nest full of such eggs is found, fifty to eighty per cent of them have already developed into seconds, blood rings and rots.

Many farmers think that even though good nests are provided the hens will not utilize them, that the hens prefer to choose their own nests. This is true in some instances. However, it has been found that on farms where one nest is provided for every four or five hens, 95% of the eggs are laid in them. Of course, the nests must be clean and free from vermin. It yields no profit to the farmer when the hens lay well but he is not able to find the eggs.

Molting.

If the hens are to go into the winter in the best laying condition, they must molt early so that their new plumage will be grown before cold weather begins. Henry Van Dreser is the originator of the method for encouraging fowls to molt early. This method consists in feeding the hens very lightly for about two weeks to stop egg production and reduce their weight, and then feeding them heavily on feed suitable for the formation of feathers. This causes the hens to molt more rapidly and more uniformly and they enter the winter egg laying season in better condition than fowls fed continually during the molting period on an egg ration. The fowls should receive more nitrogeous matter during the molting period whether the Van Dreser method is employed or not. The addition of linseed meal and more animal feed to the ration will assist in the production of a new coat of feathers.

RAISING CHICKENS.

(Including Valuable Suggestions on Using an Incubator and Brooder.)

Selection and Care of Breeding Stock.—It is necessary to have healthy, vigorous breeding stock to be successful in raising chickens. Put only the most vigorous and best grown birds into the breeding yards. Have each bird free from any serious deformity and full of life and energy. No bird should be used for breeding purposes that does not have a perfect record for health, neither should one be used that does not have good digestive powers, as they are likely to transmit these weak tendencies to their offspring. Chicks hatched from eggs of puny stock seldom get beyond their infancy, and when they do they amount to very little. Pullets are not usually as good for breeders as the year old hens, because they lay more eggs during the early winter and use up their vitality before the breeding season. One can often advantageously retain vigorous hens two to four years old in the breeding yard. In fact, hens are usually better than pullets for breeding purposes because they lay bigger eggs, and, since they do not lay as many eggs as the pullets during the fall and winter, they should be in better physical condition in the spring than pullets to give strong, vigorous, good-sized chicks. Choose a male bird that is young and active. The rule is to breed older males to younger females and vice versa. An early hatched cockerel that is well developed is generally satisfactory, or a two-year-old cock, or a good vigorous yearling may be chosen. Give the hens used for breeding purposes the best care possible, provide them with large runs and do not force them for heavy egg production during the early winter. This lowers their vitality and they will not be as good for breeding purposes. The hens should not be too fat, for fat hens as a rule will not lay many fertile eggs and chicks hatched from their eggs are usually weak. Do not let them get lousy. Use your lice powders freely. Provide a dusting bath in a dry place.

If breeders are confined, feed them a varied supply of meat, grains and green feeds and give them plenty of fresh air. The green feed helps to keep the fowls in good breeding condition. Free range is usually better than confinement in the production of hatchable eggs, as it is easier to keep up the vitality

of the stock. More males must be kept if the birds are on free range than if they are yarded.

Number of Females to One Male.—(For confined fowls) **Light, active breeds**, such as Leghorns and Minorcas under ordinary conditions, use one male to a pen of twelve to fifteen females. **Medium-sized breeds**, such as Plymouth Rocks and Rhode Island Reds, use one male to ten or twelve females. **Heavy breeds**, such as Cochins and Brahmas, use one male to no more than ten females. When twenty or thirty females are kept in one flock, keep two males. Allow one to run with the hens one day and the other the next. Keep the male not with the hens, in a coop. Mate the hens ten days before eggs are needed for hatching.

Eggs for Hatching.

1. Gather the eggs every day. Do not let them get chilled. Keep them in a room where the temperature is between fifty and seventy degrees, if possible. A greater strength of germ and higher fertility is observed in eggs kept at a temperature of seventy degrees than those kept at a lower temperature.

2. Eggs for hatching should be kept at a uniform temperature and turned daily.

3. Select eggs of uniform size. Discard eggs that are small, abnormal or poorly shaped.

4. Eggs that have thin or very porous appearing shells should not be used.

5. Use fresh eggs as nearly as possible. Never use them over two weeks old.

6. Select uniformly large eggs for hatching as it is one of the quickest ways to secure uniformity in the offspring and increase the size of the eggs.

7. Clean the dirty eggs by rubbing them lightly with a damp cloth. Be careful not to rub off any more of the natural bloom of the egg than is necessary.

8. Do not allow broody hens to set on the nests all day. It may hurt the hatching qualities.

9. Do not mix eggs of the smaller and larger breeds as the eggs of the smaller breeds often hatch earlier than those of the large breeds.

10. All hatching should be concluded by May 15th and the male birds confined for the remainder of the summer.

Number of Eggs to Hen.—This depends on the season, the size of the hen, and the size of the eggs. The average number for spring is thirteen. No more than eleven would be given the same hen in winter. After the middle of May she can handle fifteen. Give less than she can cover rather than more. If too many are given they may become chilled.

Testing Eggs.—Test each setting and remove the infertile eggs. This gives a better chance to those left. If several hens have been set on the same day and there are many infertile eggs, some of the hens can be reset. Test the eggs about the 6th or 7th day in a dark room or at night when the coop is dark. Hold the egg against the hole in the side of the box. This allows the light to shine through the egg and show its condition. An infertile egg is clear,

while a fertile egg will show a small dark spot, a spider like formation having a center with blood veins or ligaments leading outward. This formation will float as the egg is turned. The infertile eggs may be used for cooking purposes.

Home-made Testers.—Take a large shoe box or any box large enough to go over a lamp. Cut a hole a little larger than a quarter in the bottom of the box so that when the box is placed over the lamp, the hole comes opposite the blaze. Cut a hole the size of a dollar in the top of the box to allow the heat to escape. If possible get the colored egg charts from the Poultry Division, Bureau of Agriculture, Washington, D. C., and study them in testing your eggs.

Magnifying Tester.—To make this tester only the following articles are necessary: Ordinary cardboard, oat meal box, round paper box about the size of a tomato can; a few brass clinch rivets; and a small handled magnifying or "reading" glass from three to five inches in diameter. Make as follows: Cut a slot down one side from the top of the box to within about two and one-quarter inches of the bottom. The slot should be just wide enough to admit the handle of the reading glass. Next cut a length from the smaller box open at both ends two and one-quarter inches long and slip it inside the larger box, (box with slot). Then put in the glass and another section of smaller box, open at each end. Make this section solid with the rivets put through the sides of the outside box. Make a small, smooth edged hole in the bottom of the box and blacken the inside. This makes the tester complete and a revelation.

Natural Incubation.—If setting hens are given proper care and are handled with a little system, they will produce a large number of chickens at a comparatively small expense. They should be given comfortable and convenient quarters in which to set. Nest boxes should be constructed so that they may be opened or closed when necessary. A good way to prepare a nest is to cut some sod three inches thick; put this in the bottom of the nest box and cover it with a good thickness of straw or sweet hay. Put the nest in a quiet place where the hen will not be disturbed.

Insect Powder.—It is advisable to sprinkle both hen and nest with insect powder before setting her. This should be repeated once a week throughout the setting period. To apply the powder, hold the hen by the feet, head down, working the powder well into the feathers. Give special attention to regions around the vent and under the wings.

Testing Hen.—A hen should be tested before being set. To do this put her in a nest she cannot get off. Put a china egg or two under her. On the second day, toward evening, go quietly in where she is setting, leave some water and feed, open the front of the nest and let her come off when ready. If she returns to the nest after feeding, it is safe to put the eggs under her. The hens are less likely to become restless if the nests are darkened a little.

Care of Setting Hen.—If several hens are setting at the same time, care should be taken to see that they come off the nest just once a day to receive feed and water. If some do not care to come off they should be taken off and all of them should be put back on before the eggs have time to chill—say in 20 minutes in ordinary weather. If a large number are setting in a room, it is

better to let them off four or six at a time. Examine the eggs and nests and clean them. Remove all broken eggs and wash soiled ones. Any soiled nesting material should be removed and replaced by clean straw. Dirty nests soon become infested with lice and mites and this makes the hens uneasy. If the nest is infested with mites, the hen will generally stand over rather than sit on the eggs. Many eggs laid in the late winter and early spring are infertile so it is advisable to set several hens at the same time. The eggs should be tested after they have been under the hens from five to seven days, depending on the color and thickness of the shells. White shelled eggs are easier to test than brown shelled ones. The infertile and dead germed eggs should be removed and the fertile eggs put back under the hen. When the eggs are tested, it is often possible to put the eggs that several hens started under a few hens and to use the others. For example, forty eggs are set under four hens at the same time, ten under each. On the seventh day when testing we find that thirteen are infertile. This leaves twenty-seven to be reset. We put these under three hens and have the fourth hen to set over again after she has been setting only seven days. Much time can be saved in one's hatching operations this way.

Feeding Setting Hens.—Setting hens should be fed well. Their feed should be mostly whole grain such as wheat, oats and corn. They require food for their bodily maintenance. Very little meat or vegetable food should be given. The meat food would be inclined to make them want to quit setting to begin laying and the vegetable food would tend to loosen the bowels. Feed the grain in hoppers and supply fresh water in a clean vessel.

Taking Chicks from Nest.—Chicks should be taken from the nest about twenty-four hours after the first ones are hatched. They generally want to get out from under the hen and begin moving about when no more than a day old. This will often make the hen restless and cause her to leave the nest.

Incubation.

Incubators vs. Hens.—Incubators as a rule give better service than we think. Most people expect entirely too much from a machine. They read only about the big hatches as the failures are seldom printed. In comparing incubator hatches with those of hens, we forget the hens' failures. The average is not even kept in mind, so of course, we are disappointed with anything less than a 90% hatch.

There is no way of knowing just how many of the eggs set under hens hatch out, however, we believe that only about half of them produce strong chicks and only about half of those live to market size. If these figures are at all near the truth, a 50% incubator hatch should be satisfactory. Hundreds of people report 50 to 80% hatches throughout the season. Incubators are steadily gaining in popularity. People find that most of the trouble with incubators is due to carelessness in operation rather than to any imperfection of the machine. Since complete directions come with the machine, we shall not go into detail here but shall give you a few points to keep in mind when using an incubator.

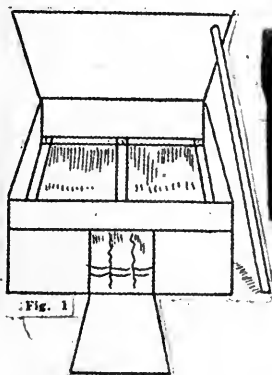


Fig. 1

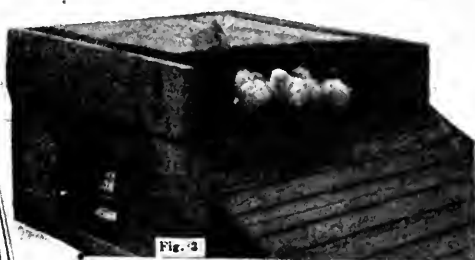


Fig. 2

A HOME MADE BROODER—CHEAP AND EFFECTIVE

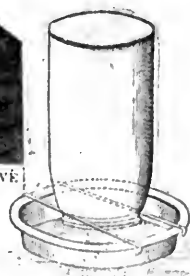


Fig. 3

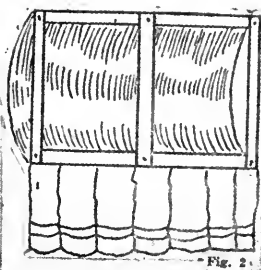


Fig. 4



Fig. 5

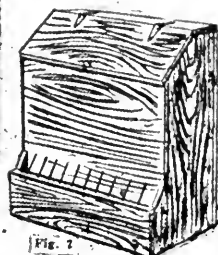


Fig. 6

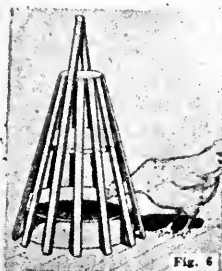


Fig. 7

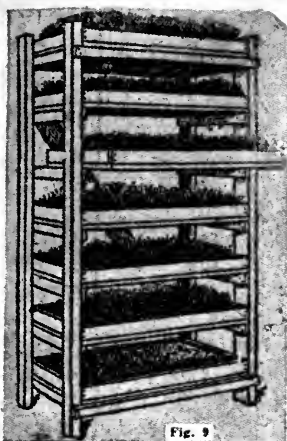


Fig. 8

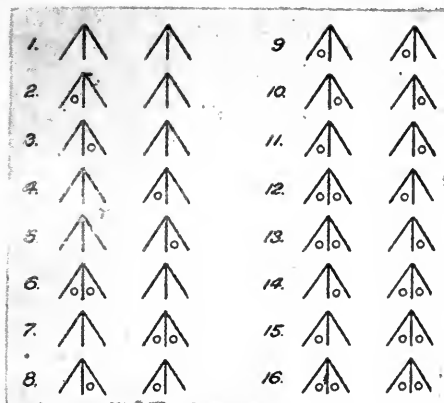


Fig. 9

1. Fireless Brooder. 2. Top to Brooder. 3. Home-made Brooder.
4. Egg Candler. 5 and 6. Methods of Keeping Water Clean.
7. Grain Hopper. 8. Toe Marks for Chicks. 9. Oat-Sprouting Cabinet.

POINTS TO REMEMBER IN USING AN INCUBATOR AND BROODER.

(Gathered from the World Over.)

1. The most successful incubator operators worry the least about their machines.
2. With good eggs and good oil in the lamp, the average incubator will perform its work without much outside assistance after it is properly started.
3. The best place to operate an incubator is in a dry, well ventilated cellar.
4. The cellar should contain no odors of decaying vegetables, should have a free circulation of air, and should not vary widely in temperature.
5. Never have an incubator in a room where the sun shines while hatching is going on.
6. Keep the incubator room clean and well ventilated.
7. Any condition surrounding the eggs which saps their vitality makes them more subject to infection.
8. Guard against the eggs being infected with bacteria or moulds. This is one of the chief causes of poor results in incubation.
9. Disinfect the incubator each time before putting in the eggs. To do this, scrub it thoroughly with coal-tar disinfectant; hot water and creosol soap, or with a solution of one gill of creolin in eight and one-half parts of soft water. Scrub each part thoroughly, especially the egg trays.
10. Dry the machine carefully before putting eggs into it.
11. Disinfect the eggs by dipping them in a solution made of one gill of creolin in eight and one-half quarts of rain water. Make a new solution each time you have a new batch of eggs to disinfect. Allow them to drain before putting them into the incubator.
12. Careless use of disinfectants is detrimental, especially using too much of them.
13. Moisture is necessary to the best results in artificial incubation. Moisture machines produce 100% better hatches by test.
14. Too much moisture is as injurious as too little.
15. The most common cause of poor results and failure in incubation is the use of eggs of low vitality.
16. Eggs only a few days old are the best.
17. Use eggs from stock that has not been over fed on green or animal feeds.
18. Turning and cooling the eggs is essential in obtaining a good hatch.
19. Within from five to seven days the eggs should be tested. (See Egg Testing.)
20. See that your air space is correct at each stage of the hatch.
21. Do not turn the eggs until the third day or after the eighteenth day.
22. The best way to turn the eggs is by hand.
23. It is necessary to turn the eggs half over.
24. Do not open the machine unless absolutely necessary except when turning and cooling the eggs.

25. After the first shell is pipped close the egg drawer and do not open it unless for a very urgent reason until all the chicks are hatched.

26. Do not try to help a chick out of its shell. If it is not strong enough to get out alone it is not worth saving.

27. It is but natural for the chicks to struggle and gasp when they first come from the shell as it gives them strength. Do not help them at this time.

28. When a very good hatch is coming off, the chicks will sometimes gather at the glass in front and pile up. To prevent this put a cloth over the glass and thus darken the machine. Never open the machine to take out a few chicks. Wait until hatch is over. Never take any out unless there is danger of losing some chicks.

29. Leave the chicks in the incubator from 24 to 36 hours. If they are left that long no harm will come to them.

30. "My best success has always been with a temperature ranging not over 102 the first week, then 103 to the time of hatching when I allowed the temperature to go as high as 105."

31. Follow the directions with your machine very closely as the manufacturer knows the way that that particular machine should be run to produce the best results.

Brooders.

1. A brooder is a necessity for those who use incubators.

2. Keep the brooder disinfected. Disinfect it between each brood of chicks. Have the bottom covered with good clean straw.

3. Operate the brooder a day or two before putting chicks into it.

4. Do not overcrowd the brooder. It is the worst mistake one can make. Have the chicks comfortable.

5. The capacity of a brooder is generally greatly overestimated by the manufacturers.

6. Have the brooder regulated at a uniform temperature day and night. Low and irregular temperatures in brooders have caused more disease and deaths than any other one thing.

7. The temperature after the first day or two should be governed by the action of the chicks, not by the thermometer.

8. Crowding of chicks to outside of brooder, panting or breathing hard, indicate too much heat.

9. Crowding and huddling about the heater indicates a need of more heat.

10. When the chicks spread out comfortably at night, midway between the heater and brooder walls, or just inside the fringe, where a hover is used, it signifies a right amount of heat.

11. The chicks should not be allowed to huddle together outside the brooder.

12. If the chicks are not supplied with artificial heat they will crowd no matter how few are in the brooder.

13. Do not take the heat away from the chicks too soon. Keep the brooder heated until they are far enough developed that they do not go under the hover.

Care and Feeding of Chicks.

Care.—If an early maturity is to be obtained with chicks, it is necessary to give them a good start. They should be given outdoor runs on dry ground and grass as soon as the weather is pleasant. They should be kept moving and not penned up in a small space where exercise is impossible.

Ground.—Exercise is necessary. They can and should be made to exercise by putting rolled oats in fine litter. Chicks should be kept inside on rainy or damp days or when the dew is heavy on the grass. Dampness often causes leg weakness and bowel trouble. They should be kept free from lice.

Feeding.—Feeding is an important factor in the successful raising of chicks. For the first thirty-six hours no feed should be given at all as the yolk of the egg is absorbed, furnishing sufficient nourishment. The two systems in vogue for feeding chicks, as well as older fowls, are dry and wet feeding. The first is simpler and easier and beginners are usually more successful with this one. More care should be given in feeding chicks than in feeding older fowls because the chicks know less about what is good for them and they are liable to overeat.

Feeds.

1. **Egg and Bread Crumbs.**—A good feed for the first meal is hard-boiled egg—the infertile eggs from the incubator may be used for this—chopped fine, shell and all, mixed with three times its amount of stale bread crumbs or bread and milk.

2. **Bread and Milk.**—Another good feed for chicks is stale bread soaked in whole or skim milk. The milk should be squeezed out until the mass crumbles easily. This is excellent for the first week or so.

3. **Oatmeal and Bran.**—Oatmeal and dry bran where they pick it is good.

4. **Green Feed.**—Green feed must be given. If the chicks can get grass they will supply themselves but if not they must be given some that can be easily assimilated. Finely cut grass, onion tops chopped fine, sprouted oats, lettuce leaves or boiled vegetables are all good.

5. **Grain Feed.**—It is well to begin grain feed when the chicks are a few days old. Feed it in hoppers. Never feed any wet, sloppy feeds as it causes bowel trouble. Several good cracked grain feeds are given. Two parts “pin-head” oatmeal, two parts wheat, one part corn, one part millet seed and one part rice.

6. **Egg and Rolled Oats.**—A good feed for the first two or three days is made by boiling the infertile eggs for about one-half hour and mixing these together with about six times their bulk of rolled oats. The eggs are put through a meat chopper.

7. **Egg and Corn Bread.**—A good feed for newly hatched chickens is corn bread with egg in it. Until they are a month old, everything fed to them should be cooked.

8. **Cracked Corn, Millet Seed, Cracked Wheat, Oatmeal and Beef Scrap.**—Another mixture is: 4 pounds cracked corn, 2 pounds millet seed, 10 pounds

cracked wheat, two pounds "Pinhead" (granulated) oatmeal or cracked hulled oats, and one pound pulverized beef scrap.

9. **Cracked Corn, Oatmeal and Millet Seed.**—Another mixture is: Steel cut oatmeal, fine cracked corn and millet seeds.

Frequency of Feeding.—Feed young chicks a very little at a time. They should be fed at least five times a day, once early in the morning, then just before they are put away for the night and three times in the intervening period. It is well the first two weeks to feed three meals of soft feed and two of hard, and after two weeks to feed two of soft and three of hard. Do not give any more moistened soft feed each time than the chicks will clean up. The feed must be kept sweet and clean as sour feed causes looseness of the bowels and dysentery. The chicks will grow faster at first if a part of the feed is ground than if just cracked grains are fed. The frequency of feeding may be decreased to three times a day after the chicks are six weeks old.

Animal Feed.—If the chicks are in the open on free range in the spring and summer they pick up bugs and insects which will help supply their animal feed. If they cannot get these abundantly, it must be furnished in some other form. The hard-boiled eggs will be sufficient when fed to the youngest chicks but later on they should be given green cut bone and beef scraps.

Water.—Cool, fresh water should always be kept before the chicks. See that the water basin is clean. This will save one much trouble later. If the chicks are allowed to get very thirsty and then fill up on water it may give them bowel trouble.

Milk.—Milk is fine for young chicks; it is highly nutritious and promotes growth, taking the place of other animal food to a certain extent. Skim milk is excellent; if whole milk is fed it is better to dilute it with one-third or one-half water.

Grit.—Grit is a necessity. A dish of it in the form of fine sand and grit should always be before the chicks.

Charcoal.—Charcoal is not a necessity but it is a fine thing to keep them in good health. It is also well to give charcoal, if the chicks are not thrifty, before changing the feed or giving medicine. Most people keep charcoal before the chicks at all times.

Exercise.—The chicks should be induced to exercise from the very first. Their grain feed should be fed in the litter to make them scratch for it. If their green feed is a cabbage or other vegetable, hang it up. This will make them jump. Exercise promotes growth and health.

Teach Chicks to Roost.—Chicks can be taught to roost by putting the perches near the floor and placing with them two old hens or older chicks that are used to roosting. If this is not effective or convenient, place the chicks on the perches after dark for a few nights and they will learn to go there of their own accord. It is often advisable to teach the chicks to roost when eight to twelve weeks of age, as they get dirty and crowd themselves on the floor. If wide roosts—three to four inches—are used there is little danger from crooked breasts.

Toe-mark Chicks.—The successful poultry raiser should know the age of his birds. It is strange to say that 95% of the farmers have no definite way of determining the age of their poultry. When a farmer markets his poultry, he ought to have some positive method of knowing the ages of the birds he is selling. Such a plan would greatly decrease the number of yearling hens and pullets which, through lack of system, are now being disposed of while older birds that ought to be sold are retained. Eggs are conceded to be the greatest source of income from the farm poultry. The pullets and yearling hens will return the farmer a much larger profit in eggs during the year than the older hens. Hens are kept, as a rule, at a good profit until their third year but after that they are seldom profitable. A great amount of money will be saved if more attention is paid to keeping a record on the ages of the chickens.

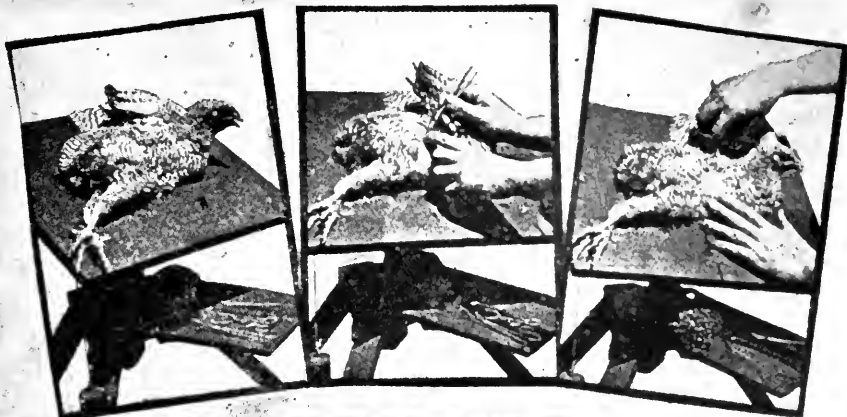
Several methods of marking poultry are used by different poultry raisers over the country but the most practical one for the farmers is that of toe-marking. Instruments for toe-marking are sold by supply houses but an ordinary saddler's punch may be used successfully. The illustration given shows sixteen different combinations of toe-marking. If just one mark is used for all chicks hatched in a given year, no farmer would have to use more than three or four of these marks, but if he desires to show the ages more closely, all the forms might be useful. The chick is toe-marked when hatched. The operation is simple and painless. An entire hatch may be marked in a very short time. All that is required is to punch the web of the foot. (See illustration for combinations.)

CAPONS AND CAPONIZING.

The Capon Industry is increasing every year. It is valuable to the Farmer.

A capon is a castrated male bird. After a bird is caponized it becomes more quiet, the comb and wattles cease to grow, it is more readily fattened and the plumage becomes glossy and heavy. Caponizing is not done to increase the weight so much as to improve the quality of the flesh. It lengthens the period of growth and the flesh retains that tender, sweet, palatable character so characteristic of spring chickens. The great difference in flavor between the flesh of capons and other fowls is not realized by very many, but in localities where it is known, dressed capons bring from 35 to 50 cents a pound. The larger the bird the more they bring a pound. They often show great fondness for little chicks and can be utilized to good advantage in rearing broods of chickens. Some people say they make better mothers than hens.

Teaching a Capon to Mother Chicks.—It is no trouble to start a capon with little chicks if he is gentle. For best results have a small yard with a coop in it. The capon should be placed in this yard a few days before the chicks are to be given him so he will get used to it. It is best to have the chicks about a week old if the capon has never raised chicks before. If the coop has no perches in it the bird will roost squatting on the floor. Just about dark the little chicks should be placed under his wings one or two at a time. The capon will not object to this but rather like it. If he seems restless tickle



LITTLE HELEN BEUOY,
CEDAR VALE, KANSAS,
MAKING A CAPON.

At the time this picture was taken Helen was only ten years old. This little girl makes spending money by working birds for the neighbors. She gets ten cents for each capon she makes. It is easy for her to operate on fifty in one afternoon. In her letter giving us the right to use the above photograph she says:

"I learned to caponize when I was nine years old, although the picture was taken when I was ten, and have caponized successfully for the last seven seasons without killing a bird. However, my youngest brother learned to caponize successfully when only seven years old."

him under the chin and talk to him in a soothing voice and all will be well. The next morning the birds should be looked after. The capon will usually be hovering the little fellows, but if he is in doubt, standing on one leg and not clucking much, they should be taken away leaving the capon alone until night when the chicks should be put under him again. By the second night the most obstinate of capons will be ready to fight for the brood. When a capon has once been taught how to brood he can be given a brood of chicks with perfect safety.

The larger breeds such as the Cochin, Brahma, Plymouth Rock, Langshan, or Wyandotte are the most suitable for caponizing.

When to Caponize.—Fowls can be caponized practically any time in the year. However, it is an advantage to perform the operation in the spring before hot weather comes. They should be from two to three months old and weigh about two pounds, depending upon their development. Caponizing is usually done about the time the cockerels begin to exhibit sexual proclivities, that is about the time they begin to crow. The operation is comparatively painless and safe as but from two to five per cent die from it. Since these die by bleeding in a few minutes, they are still excellent for table use. A good set of tools is necessary and can be purchased for two or three dollars. A complete set of instructions comes with each set so it would be a waste of space to give detailed directions here.

After caponizing, give the bird plenty of soft feed and water to drink. A capon begins eating immediately after being caponized and one would not think that any radical change had taken place in his nature. He should be left to himself as he is his own doctor for the time being. Two or three days after the operation, however, it is well to look the bird over to see if any air has gotten under the skin, causing a slight swelling or "wind puff". If one has formed, it can be relieved by piercing the skin at one side of the swelling with a sharp needle and gently pressing out the air. Feed capons nourishing, not fattening, food, thus keeping them growing. They should be allowed to grow until they are matured, which is generally one year.

Caponizing has not been widely practiced in this country so far but it is steadily gaining in favor. Any man with ordinary intelligence can learn to caponize quickly and efficiently in a short time. More capons appear on the market each year and never fail to bring a very high price.

Capons should be fattened for about three weeks before they are sent to market. Put them in a small yard and feed them two or three times a day. They can be fattened on one of the rations given under "Fattening Poultry," or on the following: equal parts, by weight, of ground oats and corn meal, moistened with milk or water.

Dress capons so they can be distinguished on the market. A good way is to leave the head and hackle feathers, the tail feathers, including those a little way up the back, the feathers on the wings to the second joint, and those on the legs halfway up the thigh. Also leave the head on as the undeveloped comb and wattles make a distinguishing mark.

SYSTEMS OF FEEDING.*(Including Some of the Most valuable Feeding Methods and Formulas Known.)*

There are two systems in common use for the feeding of fowls. One is known as the dry-feed system; the other the "mash" system. In the former all feed is given dry either whole or crushed while in the latter, one or more of the daily feeds consists of a moistened mash; i. e., the feed is ground. Poultrymen disagree as to the better of these two systems and as to the time at which grain and mash should be fed. Fowls in confinement should be fed three times a day and those having free range twice a day. There are advantages to be gained in the dry system in that it saves time and labor, and lessens the danger of bowel trouble resulting from feeding soured or sloppy mashes.

Dry Feeding.

In the dry-feeding system, a mixture of whole grains is thrown in the litter early in the morning and again about 11:30 or about an hour before they go to roost at night. A dry mash mixture is opened to them about 10:00 or 12:30 and they have access to it the remainder of the day. If one cannot feed early in the morning, it is advisable to scatter the grain plentifully in the litter after the birds have gone to roost. This grain will furnish feed for early morning. Fowls should have empty crops in the morning but the crops should never be quite full the rest of the day until roosting time. Keep the birds slightly hungry during the day and do not give them all they will eat until just before roosting time. The birds should be handled once in a while when they are on the perch and if they are either too fleshy or too poor, their rations should be changed accordingly.

Several feeds for dry feeding are given below. The feed given early in the morning and at 11:30 we call the "grain mixture" and that given at 12:30 the "dry-mash."

Valuable Feeding Formulas for Dry Feeding.**Grain Mixture.***(Amount for 100 hens).*

- 2 quarts wheat.
- 2 quarts oats.

Dry Mash.

- Wheat bran, 2 parts by weight.
- Middlings, 1 part by weight.
- Cornmeal, 1 part by weight.
- Linseed meal, 1 part by weight.
- Gluten, 1 part by weight.
- Beef scrap, 1 part by weight.

Grain Mixture.

- 3 parts by weight of corn.
- 1 part by weight of wheat.

Dry Mash.

- 2 parts meat scrap.
- 2 parts ground corn.
- 1 part bran feed.

Grain Mixture.

(Winter Ration.)

Wheat, 3 parts by weight.

Corn, 2 parts by weight.

Oats, 1 part by weight.

Whole Grain Mixture.

	By weight.	By measure.
Corn	60 pounds	36 quarts
Wheat	60 pounds	32 quarts
Oats	30 pounds	30 quarts
Buckwheat .	30 pounds	20 quarts

Whole Grain Mixture.

(For Summer.)

	By weight.	By measure.
Corn	60 pounds	36 quarts
Wheat	60 pounds	32 quarts
Oats	30 pounds	30 quarts

This mash mixture is fed in dry hoppers kept open only in the afternoon. The whole grain feed should be restricted so that they will eat at least one-third ground feed.

Grain Mixture.

Corn	10 pounds
Wheat	10 pounds
Oats	5 pounds
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	25 pounds

Dry Mash.

(Winter Ration.)

60 pounds of cornmeal.
 60 pounds wheat middlings or shorts.
 50 pounds meat scraps.
 30 pounds wheat bran.
 10 pounds linseed oil meal.
 10 pounds milled alfalfa.
 11 pounds salt.

Mash Mixture.

(For Winter and Summer.)

	By Weight.	By Measure.
Wheat middlings...	60 lbs.	71 qts.
Cornmeal	60 lbs.	57 qts.
Wheat bran.....	30 lbs.	57 qts.
Oil meal.....	10 lbs.	8 qts.
Alfalfa meal.....	10 lbs.	20 qts.
Beef scrap.....	50 lbs.	43 qts.
Salt	1 lb.	½ qt.

Dry Mash.

Bran	5 pounds
Shorts	5 pounds
Meat Scraps.....	3½ pounds
<hr/>	
	13½ pounds

In order to keep the above feed properly balanced the 13½ pounds of mash should be consumed in the same time as the 25 pounds of whole grain. Hens are inclined to eat too much of the whole grain and slight the mashes. This must be prevented. The above mixtures are figured out for confined hens and should be varied to meet other conditions.

Grain Mixture.

Wheat, 10 parts by weight.

Corn (cracked preferred), 10 parts by weight.

Oats, 5 parts by weight.

Dry Mash.

Corn meal, 6 parts by weight.
 Middlings, 6 parts by weight.
 Bran, 3 parts by weight.
 Beef scrap, 5 parts by weight.
 Oilmeal, 1 part by weight.
 Alfalfa meal, 1 part by weight.

Grain Mixture.

360 pounds cracked corn.
 200 pounds wheat.
 130 pounds oats.

Dry Mash.

32 parts corn meal.
 30 parts ground alfalfa.
 30 parts animal (meat) meal.
 2 parts oyster shell.
 1 part grit.
 1 part charcoal.

Mash Feeding.

Where dry feeding and mash feeding have been compared it has been found that chickens are very fond of broken grain and whole grain moistened and that they will eat such material better than a dry mixture of finely ground feed. The mash is moistened with water or milk. It should be a comparatively dry, crumbly mash, and not a thin slop. For the morning feed, grain scattered in the litter is preferred as this exercises the birds. It should be given as soon as possible after they leave the roost. The moistened mash should be given at noon—all that the chickens will eat in fifteen to twenty minutes—and at night just before roosting time a liberal supply of grain should be scattered in the litter. (Many poultrymen feed the mash in the morning and a few feed the mash at night. It is probably more important that a part of the grain is ground than that it is fed at a particular time of day.) The following sample mashes are given:

Valuable Formulas for Mash Feeding.

150 pounds ground oats	100 pounds wheat bran
150 pounds wheat bran	100 pounds ground corn
100 pounds corn meal	100 pounds ground barley
30 pounds linseed meal	100 pounds ground oats
30 pounds beef scraps.	
	100 pounds corn meal
100 pounds corn meal	100 pounds wheat bran
100 pounds wheat bran	75 pounds cut clover or alfalfa
100 pounds ground oats	75 pounds wheat middlings

Miscellaneous Feeds.

Mustard.—Keeps the chickens healthy. Makes the hens lay more eggs. The feeding of mustard is a revelation to poultry keepers. When fed to breeding stock their vigor and stamina are increased, the eggs are highly fertile and they hatch strong chicks. When fed to the other fowls it increases their health and vigor. Mustard is not found to be a stimulant but a mild tonic.

Can be had by Farmer.—Mustard greens can be easily raised in any climate and fed to the chickens with excellent results. Ground mustard is another form in which mustard is fed. In feeding this use about one teaspoonful for six hens.

Mustard Bran.—This is a by-product of the spice mills and if it can be obtained is cheaper than ground mustard. There are two kinds of the bran—brown and yellow. The yellow is considered the best. Mustard bran is fed in the mash, wet or dry. When dry it has no odor. Feed just enough bran to flavor the mash, except in case of hens just over the molt that refuse to lay.

Pullets should be given small doses of mustard about a month before it is time for them to lay and the quantity increased as they approach laying age. At this time begin feeding it to all stock and it will solve the fall and winter egg problems.

Animal and Green Feeds.—Chickens are able to pick up a large amount of insects, worms, and other low forms of animal life during the summer, but in the winter months a substitute must be given them. For this purpose meat scraps, such as offals from butchering, green cut bone, animal meal and beef scraps are excellent. The same is true of green feeds. Chickens must have the animal and green feeds in addition to the dry grain feeds to keep them healthy.

Silage.—The secretary of the Wisconsin Poultry Association advises that silage made from corn is being fed to poultry in that state with splendid results. It is fine to make hens lay. The average run of silage is the best. If there is too much grain in it, the hens become too fat to lay. There is no question but silage is going to be used more largely in feeding poultry.

Hay.—Clover hay makes a fine feed for chickens. Prepare it as follows: Cut it as short lengths as possible ($\frac{1}{4}$ to $\frac{1}{2}$ inch) and place in a bucket. Pour boiling water over it and allow it to stand two or three hours or over night. When ready to feed, drain off the water and mix the hay with the mash. The hay may make about one-half the bulk of the feed. The exact proportion is immaterial. Any kind of hay is valuable but clover hay is best. Do not give too much bulky feed.

Table Scraps.—In feeding table scraps, salt and acids of one kind or another should be avoided as much as possible. The feeding of large quantities of scraps is not very satisfactory, inasmuch as it has to be fed in a trough, and when given to the birds they generally pick out the pieces and scatter them all about the house in the litter, and it makes a more or less bad method of feeding. They should be fed fairly dry; that is, they should always be well drained, so there will be no liquid matter in with the scraps.

Birds cannot be kept on table scraps alone. This form of feed is a roughage and should be considered as nothing more than a variety or stimulating feed given along with the regular rations of grain and mash. It acts as an appetizer and is a valuable feed when given fresh. Moldy and sour feeds should be guarded against.

Corn Gluten.—Corn gluten feed makes an excellent addition to the ration and may be procured through almost any feed store. It is highly palatable and may be fed to advantage in the dry mash with other feed, such as follows: One hundred pounds of cornmeal, one hundred pounds of bran, one hundred pounds of white middlings, one hundred pounds of corn gluten feed, one hundred pounds of meat scrap, six pounds of charcoal, six pounds of salt.

Grit.—Grit is essential to economy in feeding and to the health of the fowls. It aids the digestion as it takes the place of teeth and is required for the proper preparation of feed in the gizzard. If the feed is not properly taken care of by this organ, an undue strain is thrown on the fowl's whole system. This often causes disease and allows a great deal of nutriment to pass through the bird's body without being absorbed. A box of grit should be kept in every pen and yard. It gives the fowls strong bones, bright plumage and aids in the assimilation of the food.

Charcoal.—Charcoal is fine for chickens when their stomach is sour and their digestion has been impaired. It acts as a corrective because it has a great absorptive power for gases, impurities, and acids. It is often well to give charcoal to the birds in case they are dumpy before the feed is changed or before medicine is given. Charcoal of excellent quality can be made by burning a pile of corncobs until it is a glowing mass and then dousing it with water.

Varied Ration Important.—In feeding grain one must give a variety. No one kind of grain is best. Variety should be secured by feeding different kinds of grain on different days or by mixing the grain. If grain is made the sole feed, fat instead of eggs is the result.

Feeds Interchangeable.—The following grains may be substituted for each other in the manner indicated below. That is not saying that any one is exactly equal in food value to the one opposite but they do not vary far enough to make a material difference. If one grain is high in price in your locality it will be a saving of money for you to use another and sacrifice the difference in food value in that direction.

Grain.	Substitutes.
Wheat	Corn, barley, oats, kafir-corn.
Corn	Buckwheat (too fattening fed alone), wheat.
Oats	Wheat, barley, kafir-corn.
Barley	Wheat, oats.

Quick Fattening.

To fatten readily, the poultry must be put in a small place where they will have very little space to run about and a place that can be darkened, just enough light being admitted for them to see to walk about when not eating. If they have little exercise they will fatten more readily. The sexes should be separated. Make a small "V" shaped trough, like a hog trough, only smaller, in which to put the wet food. The essentials of fattening are quiet, darkness, except at meal time, and plenty of soft feed given at regular intervals, usually three times a day. Give the birds plenty of water, grit, and charcoal. Keep all green feed from them. Vegetables may be given if necessary to vary the ration. Fowls should be marketed at once when fat as they will lose their appetites when fed too long and begin losing weight. If a bird shows signs of getting off its feed, it should be sent to market immediately or put on the

range to recuperate. It takes from ten days to two weeks to fatten poultry. Fowls brought up in confinement are much better for the table than those off the range.

Feeds for Quick Fattening.

1. **Oats, Wheat, Middlings and Cornmeal.**—Feed a mixture of ground oats, cracked wheat and wheat middlings, cornmeal, scalded and made into a dough with hot water. Feed as often during the day as the chickens will eat the feed clean.

2. **Cornmeal, Bran and Sour Milk.**—Equal parts of cornmeal and bran mixed to a thin batter with buttermilk or sourmilk makes a good fattening ration. Give little first day; after that give all they can eat in twenty minutes.

3. **Buckwheat Flour, Cornmeal and Milk.**—Make a mixture of buckwheat flour, cornmeal and milk. Mix these to a batter that will just drop from a spoon but not run. Feed all they will eat. Remove troughs after feeding. Fowls fattened this way are deliciously palatable and tender.

4. **Barley, Oats, Corn, Beef Scraps and Buttermilk.**—Take equal parts of finely ground barley, finely ground oats (with hulls sifted out), finely ground corn. To this mixture add 10% of beef scraps. Use buttermilk if possible, if not, skim milk for moistening. Feed at regular intervals.

5. **Corn, Oats, Flour and Tallow.**—A fine ration may be made as follows: 100 pounds ground corn, 100 pounds ground oats, 50 pounds flour and 4 pounds tallow.

Cramming.

If some of the fattening stock does not eat all they should they can be crammed to good advantage as follows: Make the feed into balls about one-half inch in diameter and two inches long. Have from fourteen to eighteen balls for each bird. Sit down on a box or stool, grasp the bird firmly between the knees, elongate the neck, grasping the head in the left hand, and placing the first finger in the mouth to keep it open. Then dip one of the balls in skim milk or water and force it into the bird's mouth, pressing it down the throat with the finger. Next grip the neck above the ball with the thumb and first finger; run them downward along the neck and force the ball into the crop. It will take fourteen to eighteen to fill the crop of one bird. Cramming is done just before roosting time. One can soon learn to cram the birds easily and readily.

MARKETING POULTRY AND POULTRY PRODUCTS.

(Including Systems of Marketing, Employed by People All Over the Country.)

The average farmer and poultryman can generally figure out that he is making a profit from his chickens, but it cannot be denied that with better methods of preparing fowls for market and better systems of marketing, the profit made from them would be much greater. In the far East where more care is taken in the marketing and in localities farther west where system is

used, poultry products bring prices far above the average. Farmers are realizing more and more that the farm hen who "just eats her head off" can be handled so as to produce a handsome profit. All the loss from poor handling comes out of the farmer. The farmer should study his market conditions and learn how to successfully meet the requirements of his particular market. Where marketing is done to the best advantage, farmers find that it is important to have their products put up in an attractive style. They insist upon selling them on a quality basis. Such farmers study the details of killing, dressing and packing that they may arrange their products in the best manner possible.

Killing and Dressing Chickens.

Killing.—The birds should not be allowed a bit of food for eighteen to thirty-six hours before killing if they are to be sent off the farm undrawn. If they are to be drawn (i. e., inwards removed), feed should be kept from them at least ten hours before killing. In either case keep all drinking water from them for at least eight hours before killing. If food is left in the crops it quickly ferments and produces an uncanny appearance in the fowls. When ready to kill, suspend the fowls by the legs and lock the wings together to prevent flapping. You can take all sense of feeling from the birds by piercing the brain with a knife run through the roof of the mouth or by hitting the bird a blow on the head. After this is done, the blood vessels in the neck should be cut. To do this, grasp the fowl by the comb or feathers on the back of the head with the left hand; with the right hand insert the blade of a sharp knife in the neck back of the ear lobe and run the blade through the neck. Give the blade a twist in withdrawing it. This will sever the artery and cause the blood to flow freely. Another way to cut the artery is by running the knife through the mouth into the back part of the throat. The blood should be saved as it makes a fine food for laying hens and young fowls.

Dry Picking.—Most markets prefer dry-picked birds. Dry-picking should be begun immediately after killing, before the bird stops bleeding and the flesh has a chance to become cold. Care must be taken not to tear the skin. Pick up the breast and up the side to tail, unlock the wings and pick them also; remove the feathers from the back, and finish the job by plucking. If no time is lost, the feathers will come out easily. A slightly higher price is usually received on the market for dry-picked fowls than for those which are scalded before picking. The work of dry picking is, of course, a little more tedious than after scalding, however, the dry-picked fowl is in better shape for the market.

Scalding.—To scald a bird, it should be immersed in hot water a little below the boiling point as soon as it is through bleeding. The bird should be immersed three or four times. Holding it by the neck and legs, dip the breast and then the back into the water. It is now ready for plucking. Be careful not to over scald, as this will cause the outer surface of the skin to rub off.

Drawing.—If the market demands a drawn fowl, cut a slit about an inch long from near the end of the keel bone, back of the vent and parallel with it, large enough to insert the fingers. Insert the index finger and remove the intestines. To remove the egg sac and lower end of the intestines, it may be necessary to enlarge the slit to a half circle so that it joins the end of the vent. Cut off the head, then draw the skin back about half an inch and cut off that much of the neck bone. Next pull the skin forward and tie.

Shrinkage.—If the intestines are not removed, fowls lose from eight to eleven percent. If the intestines are removed they lose from twenty-five to thirty percent. The shrinkage will not exceed the smaller figures given if they have been well fattened and have been deprived of food at least twelve hours before killing.

Plumping.—To plump a fowl, dip it for about eight or ten seconds into nearly boiling water, then immerse it in cold water and let it remain for fifteen or twenty minutes. If the fowls are to be shipped allow them to become thoroughly dry.

Packing.—Birds should be thoroughly cooled before packing. Pack them neatly and cleanly and in packages that can be easily handled. Any farmer delivering dressed poultry in town can greatly improve the looks of his product by packing each bird in a small pasteboard box, back downward. Proper packing will make a more salable product and should bring a higher price.

Points on the Care of Eggs.

1. **Gather Eggs Daily.**—Eggs should be gathered every day. They spoil easily.

2. **Keep Eggs in Cool Place.**—Keep them in a cool, well-ventilated place. An egg is over seventy percent water and the water evaporates through the shell.

3. **Producing Infertile Eggs.**—Keep only two or three roosters for the breeding season and kill the rest. Hens lay better without them. You will not be troubled with rotten eggs if you have no roosters in your flocks when not needed.

4. **Nests.**—Have a nest for every four or five hens. Keep the nests clean and free from vermin. One of the greatest causes of poor eggs is poor nests. Clean nests mean clean eggs.

5. **Clean Dirty Eggs.**—Clean the eggs before sending into market by rubbing them lightly with a damp cloth in case dirt gets on them.

6. **Sell Eggs Every Week.**—Sell your eggs every week. Do not give time for the water in them to evaporate. A stale egg is always shrunken. In time it becomes light enough to float.

7. **Test Eggs.**—Test the eggs before sending them to market. Be sure they are all good. The loss from bad eggs comes out of the farmer's profit in the end.

8. **Sort Eggs.**—Sort the eggs before sending them to market. Have those of like color together. Use the small or dirty eggs at home. Insist upon selling them on a quality basis.

Grading Eggs.

Proper grading and marketing of eggs is an important subject and one which does not receive the attention it deserves. It is neglected mostly by the smaller egg producer who is not properly posted along this line. He is not informed on market conditions and does not realize the losses which result from the lack of attention to grading.

Grades of Eggs.

Fresh Eggs.—An egg to be accepted as a first class, or fresh egg, must be newly laid, clean, of normal size, showing a very small air cell, and must have a strong, smooth shell, of even color and free from cracks. With the exception of the air cell, which is only visible through the aid of the candle, these are the points by which eggs are graded in the early spring, at which time they are quite uniform in quality, thereby making candling unnecessary.

Checks.—This term applies to eggs which are cracked but not leaking.

Leakers.—As indicated by the name, this term applies to eggs which have lost a part of their contents.

Seconds.—The term "seconds" applies to eggs which have deteriorated to a sufficient extent as to be rejected as firsts. They are, however, of a high enough quality to be used for human consumption. The several classes of eggs which go to make this grade may be defined as follows:

(a) **Heated egg:** One in which the embryo has proceeded to a point corresponding to about 18 to 24 hours' normal incubation. In the infertile egg this condition can be recognized by the increased color of the yolk; when held before the candle it will appear heavy and slightly darker than the fertile egg.

(b) **Shrunken egg:** This class of seconds can be easily distinguished by the size of the air cell. It may occupy from one-fifth to one-third of the space inside the shell. The holding of the eggs for a sufficient length of time to allow a portion of the contents to evaporate, is the main cause of this condition.

(c) **Small egg:** Any egg that will detract from the appearance of normal eggs on account of its small size, will come under this class although it may be a new laid egg.

(d) **Dirty egg:** Fresh eggs which have been soiled with earth, droppings, or egg contents, or badly stained by coming in contact with wet straw, hay, etc., are classed as seconds.

(e) **Watery egg:** Those in which the inner membrane of the air cell is ruptured, allowing the air to escape into the contents of the egg and thereby giving a watery or frothy appearance.

(f) Presence of foreign matter in eggs: Small blood streaks or clots. This condition is found in many fresh laid eggs. Often eggs are laid which show small clots the size of a pea. These are sometimes termed "liver" or "meat" spots.

(g) Badly misshapen eggs: Eggs which are extremely long or very flat, or in which part of the shell's surface is raised in the form of a ring; in other instances a number of hard, wartlike growths appear on the outside of the shell.

Spots.—Eggs in which bacteria or mold growth has developed locally and caused the formation of a lumpy adhesion on the inside of the shell. There are three well recognized classes of mold spots—namely: White, brown and black. In cases where an infertile egg has been subjected to natural heat for a sufficient period of time, the yolk will often settle and become fixed to the membrane. This condition might be termed a "plainspot."

Blood Rings.—Eggs in which the embryo has developed to a sufficient extent so that it is quickly recognized when held before the candle. It has been found that it requires between twenty-four and thirty-six hours of incubation under a setting hen to produce this condition.

Rots.—Eggs which are absolutely unfit for food. The different classes of rots may be defined as follows:

(a) Black rot: This is the easiest class of rots to recognize and, consequently, the best known. When the egg is held before the candle the contents have a blackish appearance, and in most cases the air cell is very prominent. The formation of hydrogen-sulphide gas in the egg causes the contents to blacken and gives rise to the characteristic rotten egg smell and sometimes causes the egg to explode.

(b) White rot: These eggs have a characteristic sour smell. The contents become watery, the yolk and white mixed, and the whole egg offensive to both the sight and the smell. It is also known as the "mixed rot."

(c) Spot rot: In this the foreign growth has not contaminated the entire egg, but has remained near the point of entrance. Such eggs are readily picked out with the candle and when broken show lumpy particles adhering to the inside of the shell. These lumps are of various colors and appearances. It is probable that spot rots are caused as much by mold as bacteria, but for practical purposes the distinction is unnecessary.

To all intents and purposes the spot rot, as explained above, is practically the same as the brown and black spots described under the general head of "spots." The spot rot is also placed under the general head of rots, simply because some candlers will call it a spot while others designate it as a spot rot. Pink and blood rots are names which are also applied to certain classes of rotten eggs, the pink rot deriving its name from the peculiar pinkish color of the contents when held before the candle. The same is true of the blood rot, which is bloody or red in appearance.

If the farmer will study the foregoing and then grade his eggs accordingly, he will soon obtain better prices and will build a reputation for quality which will soon result in a gain for him financially.

Home Preservation of Eggs.

Preserved vs. Fresh Eggs.—Many people desire to preserve eggs for home use when they are getting a great number of them. Preserved eggs are as good for nearly all purposes as fresh eggs if the preservatives are properly made and the eggs are strictly fresh when put into them.

Eggs Should be in Good Condition.—Eggs from hens that have no males running with them will keep longer than eggs that are fertile. It is best to put the eggs into the preservative the day they are gathered, being very careful not to use any with cracked or dirty shells.

Putting Eggs in Preservative.—Care should be taken not to crack the shells when placing them in. They may rest in any position. Eggs that do not remain beneath the surface of the solution should be weighed down. Be sure to have at least two inches of the solution above the eggs. When the eggs are removed for use they should be wiped. Before boiling eggs that have been preserved in a liquid, puncture the shell with a needle to keep them from cracking.

Containers.—Barrels, earthenware vessels, cement tanks and galvanized tin buckets are all suitable for storing eggs. The container should be clean and scalded to make it free from all germs. Keep the vessel containing the eggs in a dark, cool place and do not disturb it any more than necessary.

Methods of Preserving Eggs.

Water-Glass.—This is one of the best methods for home use. To preserve eggs by this method use one gallon of water-glass (sodium silicate) to nine or ten gallons of water. Boil the water, add the water-glass, and mix the solution thoroughly. Put it in a clean container where the eggs are to be stored and it is ready for use. The vessel need only be half filled as the eggs will make it rise. Before using the eggs stored in water-glass, rinse in warm water and wipe them dry. Water-glass is nonpoisonous and is harmless to both hands and clothes. It acts only on the shell of the egg, making it water and air tight and costs from 60 to 75 cents per gallon. One gallon of water-glass makes enough liquid to preserve from 75 to 100 dozen eggs. The solution should not be used a second time.

Will Keep a Year.—Eggs preserved by this method will keep at least a year in good condition. April, May and June are the best months in which to preserve eggs. Those put down in too hot weather will not come out quite so well as those put down earlier. If eggs are put down in the months named, use those put down in June first, then those in May, and those in April last.

Limewater.—A good limewater preservative can also be made as follows: 6 gallons of water, one quart of salt and 3 quarts of finely slaked lime. After stirring thoroughly allow the solution to stand about three days and pour off the liquid for the preservative. The eggs can be put in the container after the limewater or they may be put in first and the limewater poured over them. Have at least two inches of liquid above the top layer of eggs. Lime preserved eggs can be distinguished by the roughness of the shell.

Bran and Salt.—Packing in bran has been found to be a satisfactory method of preserving eggs in many cases. They may also be preserved for several months by packing them in dry salt. Have at least two inches above the upper layer of eggs in either case.

Grease and Paper.—Eggs may be kept for some time by greasing them and wrapping each one in paper.

Rolled Oats.—In cold countries like Alaska they preserve eggs by simply packing them in rolled oats.

Marketing.

Selling Direct to the Consumer.—If the farmer produces a high quality of goods, puts them up in attractive style, and carefully works up a large retail trade in a nearby town, he will find this method of disposing of his goods the most profitable because he eliminates the charges of the middlemen. To do this successfully, however, he must study his customers and learn their tastes. In fact, he must be a salesman. The eggs should be carefully graded. Many farmers who have worked up a good retail trade have found it advisable to pack the eggs in paste-board egg boxes, holding one or two dozen as the trade demands. This enables one to easily grade the eggs since he can quickly pick out a dozen alike. This way a customer desiring eggs of a certain color can be supplied. Keep them covered. It is also possible to secure customers in a city within reasonable shipping distance, expressing them a certain amount of eggs at regular intervals (once or twice a week). By furnishing eggs of a superior quality and having them strictly fresh, the farmer can soon secure a substantial increase over prices paid in the open market. Hotels, clubs and restaurants are also good customers to supply.

Selling Direct to Retailer.—In selling direct to the grocery or provision dealer, seek out the one who caters to a select trade. Sell your goods on a quality basis and secure the top price.

Selling to Commission Merchants.—The returns by following this method are usually not as great as the others but it is the simplest and does away with the trouble of handling the private trade. In selling to commission merchants, try to deal with those who have developed a trade along a certain line as they can pay the highest prices.

Shipping by Parcel Post.—The parcel post offers a means by which eggs can be shipped direct from the farm to the consumer. It is rather new, but is fast becoming popular. Eggs to be shipped by this method must be of a first class quality and have the best of care. The postal requirements are as follows: Eggs shall be accepted for local delivery when so packed in a basket or other container as to prevent damage to other mail matter. This embraces all collection and delivery service within the jurisdiction of the local office. Eggs shall be accepted for mailing regardless of distance when each egg is wrapped separately and surrounded with excelsior, cotton, or other suitable materials and packed in a strong container made of double-faced corrugated pasteboard, metal, wood or other suitable material and wrapped

so that nothing can escape from the package. All such parcels shall be labeled "Eggs." Eggs in parcels weighing more than 20 pounds, shall be accepted for mailing to offices in the first and second zones when packed in crates, boxes, buckets, or other containers having tight bottoms to prevent the escape of anything from the package and so constructed as properly to protect the contents. Such packages to be marked, "Eggs—This side up," and to be transported outside of mail bags. The weight of a single dozen of eggs in a carton properly packed and wrapped for mailing will weigh from 2 to 3 pounds. If the eggs are small, the container light, and the package does not weigh over 2 pounds, the postage within the 150 mile limit, or first and second zones, would be 6c; if the package weighed between 2 and 3 pounds it will cost 7c within the first and second zones under normal conditions. Remember that the sender's name and address preceded by the word "From" must be on every package. It is well to know that the larger the package (within the size and weight limits) the cheaper is the postage as the first pound costs 5c within the first and second zones, while each additional pound, up to 50, only costs 1c.

Marketing Through a Creamery.—In some localities marketing through a creamery has been found very profitable. To make the most of this method a high quality of product should be maintained and the eggs stamped so that the consumers, recognizing the merit of the goods, will call for them. A market is sought in a city. Some large grocery store is good. It does not take long to work up a paying business by following this plan, as the quality of the goods calls for high prices.

Co-operative Marketing.—In a few sections of our country the organization of egg circles for the co-operative marketing of eggs has been successfully tried out. In European countries this system has been very successful and we believe it deserves more widespread attention in the U. S. This method is similar to the one of marketing through a creamery. However, instead of the creamery tending to the business, a manager is hired to collect and dispose of the eggs. The manager must have considerable ability since the success or failure of the undertaking rests largely upon him. Usually twenty-five or thirty farmers form one group. They agree to furnish fresh, sorted, strictly guaranteed eggs. In this way they put out an article of high quality and soon raise the standard of their product. With a better article comes a higher price.

There is more money in the poultry business every year for the farmer who markets his poultry products in a systematic way. It will pay him to give more attention to this branch of the business.

SIMPLE SYSTEM OF POULTRY ACCOUNTING.

It shows:

1. The value of the houses and appliances.
2. Value of stock.
3. Amount of feed bought and its cost.

4. Number of eggs laid each day in the year.
5. Average number of eggs laid by each hen.
6. Number of eggs used at home.
7. Number of eggs used for hatching.
8. Number of eggs sold and money they brought.
9. Value of stock sold.
10. Value of extra time used in care of poultry.
11. Profit at end of year.

Keep track of the poultry. See if the chickens are making money for you. Be square with yourself and with the hens. A system of poultry accounting is one of the greatest needs of most poultry keepers. A poultry raiser should have a definite record of receipts and expenditures.

Simple Plan.—We hereby give you one of the simplest forms possible for keeping track of the poultry flock. By following this simple plan, the raiser can know definitely the standing of his chickens at the end of each year.

Forms Necessary.—The only forms necessary are: Egg record monthly sheet, yearly summary sheet, balance sheet, and inventory sheet. These forms can be ruled off either on loose sheets of paper or in a blank tablet or book. The latter is really the best at it removes the danger of the pages being scattered. When it is used the left hand page can be used for the debits and the page opposite or right hand page for the credits.

Debit or Dr.—On the debit side of the account is put the value of feeds fed to the flock, the value of extra labor (if just the extra labor is put down then the profit at the end of the year, shows the returns for the regular time and labor spent in caring for the flock.), cost of any appliance on anything to be used for flock, etc.

Credit or Cr.—On the credit side is kept the returns on the flock such as money received for eggs, or fowls sold, and the value of things used at home, as birds or eggs eaten. By noticing the examples given and following them, one can soon learn the side on which to enter an account.

Egg Sheet.—This sheet is to keep an account of the number of eggs gathered each day, so as to check up on those used at home and credit the flock with them. If the columns headed "Average number of hens" and "Average egg production" are used it will show if the hens are laying satisfactorily. The "average number of hens" can be determined by keeping track of the deaths each month. The exact number would be as follows: Suppose that in a 31 day month there were 62 hens at the beginning of the month, that 2 died on the 7th and 1 on the 20th. For the first 7 days there were 62 hens, for the next 13 days there were 60 hens, and for the last 11 days there were 59. The average number equals:

$$\frac{(7 \times 62) + (13 \times 60) + (11 \times 59)}{31} = 60.1$$

An approximate "average of hens" close enough for practical purposes may be obtained by taking the average between the number of hens at the be-

ginning and the end of the month. Suppose there were 40 hens at the beginning and 36 at the end of the month. To find the average add these two numbers together and divide by 2.

Average Egg Production.—After the “average number of hens” is obtained the “average egg production” is determined by dividing the total number of eggs laid by the “average number of hens.”

YEARLY EGG RECORD

Day of Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1.....												
2.....												
3.....												
4.....												
5.....												
6.....												
7.....												
8.....												
9.....												
10.....												
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22.....												
23.....												
24.....												
25.....												
26.....												
27.....												
28.....												
29.....												
30.....												
31.....												
Total.....												
Average number of hens.....												
Average egg pro- duction.....												

Monthly Sheet.—One monthly sheet is used for each month in a year. All chickens and eggs consumed at home should be put on the credit side of the sheet at their regular market value. Eggs used for hatching purposes should be put on both the debit and credit sides at the same price. If the demand for hatching purposes is great enough to take care of all suitable eggs, the price should be the rate obtained for hatching eggs. If only the extra labor re-

quired now and then is debited against the flock, the balance at the end of the year represents the payment the chickens have made for the raiser's time. However the raiser's time can be estimated and debited against the flock each month, if desired. The balance sheet at the end of a year, will then show the net profit of the flock. In the column headed "Equipment" should be charged such purchases as brooders, incubators, etc. Glass, roofing paper, lumber, etc., should be charged under "Miscellaneous." If day-old chicks are sold they should be credited under "Breeding Stock."

MONTHLY SUMMARY SHEET

Dr.

Date	Item	Feed	Equip-ment	Labor	Mis-cella-neous	Total
1918						
Apr. 1	Lumber.....	\$3.00				\$3.00
6	Carpenter work on brooder.....	3.00				3.00
7	1 indoor brooder.....	3.25				3.25
8	6 gallons kerosene.....			\$2.00		2.00
9	3 bushels wheat.....				\$4.00	4.00
10	4 bushels shelled corn.....		\$8.00			8.00
11	5 bushels oats.....				.72	.72
19	100 pounds beef scrap.....				5.75	5.75
21	100 pounds oyster shell.....	.80				.80
25	300 eggs for hatching.....	3.75				3.75
	Total.....	13.80	8.00	2.00	10.47	34.27

CR.

Date	Item	Mar-ket eggs	Hatch-ing eggs	Market P'ltry	Breed-ing stock	Mar-ket stock	Total
1918							
Apr. 4	300 eggs, hatching (home use).....	\$2.40					\$2.40
9	100 eggs, hatching.....				\$5.00		5.00
12	10 dozen eggs, at 24 cents.....	4.32					4.32
14	18 dozen eggs, at 24 cents.....			\$0.55			.55
15	1 pen breeding fowls.....			1.80			1.80
16	1 hen (home use).....	1.92					1.92
17	3 market hens.....	3.45					3.45
19	8 dozen eggs (home use), at 24 cents.....	1.61					1.61
20	15 dozen eggs, at 23 cents.....		\$5.75				5.75
20	7 dozen eggs (home use), at 23 cents.....				3.00		3.00
25	50 day-old chicks.....	1.61					1.61
28	7 dozen eggs (home use), at 23 cents.....		3.00				3.00
30	6 dozen eggs, at 22 cents.....	1.32					1.32
	Total.....	16.63	8.75	2.35	8.00		35.73

Yearly Sheet.—The totals of each "Monthly Record" are entered on this sheet as is shown by the sample given. (Shown on following page.)

Yearly Summary Sheet.

DR.

CR.

Date	Feed	Equip- ment	Labor	Mis- cella- neous	Total	Mar- ket eggs	Hatch- ing eggs	Mar- ket P'ltry	Breed- ing stock	Total
1919										
January...	\$11.25	\$18.00		\$ 2.45	\$31.70	\$21.65		\$ 2.35		\$22.00
February...	10.85		\$ 2.00	2.00	14.85	24.83		3.30		40.66
March...	11.50	20.00		9.90	41.40	20.66	\$ 6.50	3.50	\$10.00	35.73
April...	13.80	8.00	2.00	10.47	34.27	16.63	8.75	2.35	8.00	36.95
May...	13.00			5.35	18.35	11.52	4.50	4.25	8.00	39.23
June...	15.50		2.50	5.45	23.45	6.00	5.75	15.20	10.00	31.02
July...	14.15			1.10	15.25	7.08	2.00	22.15	8.00	36.61
August...	13.80			4.95	18.75	5.37		13.90	4.00	22.90
September...	15.00		2.25	.45	17.70	9.10		10.80	3.00	23.27
October...	16.10			2.75	18.85	8.60		4.40	9.00	24.00
November...	4.80		1.00	1.43	17.23	8.17		7.85	15.00	28.13
December...	13.75			8.15	21.90	12.56		4.05	20.00	28.27
Total...	163.50	46.00	9.75	54.45	273.70	152.17	27.50	94.10	95.00	368.77

Balance Sheet.

Balance Sheet.—On this sheet are entered the year's expenditures and receipts which are the totals of the "yearly summary sheet." Also the totals of the invoice sheets are entered, etc., as can be easily understood by sample.

	Dr.	Cr.	Bal.
Value of inventory January, 1, 1918.....	\$409.00		
Interest at 6 per cent on capital invested, as represented by value of inventory above.....	24.54		
Expenditures during 1918.....	273.70		
Value of inventory January 1, 1919.....		\$479.70	
Receipts during 1918.....		368.77	
Total.....	\$707.24	\$848.47	
Balance of year's profits.....			\$141.23

Inventory Sheet.

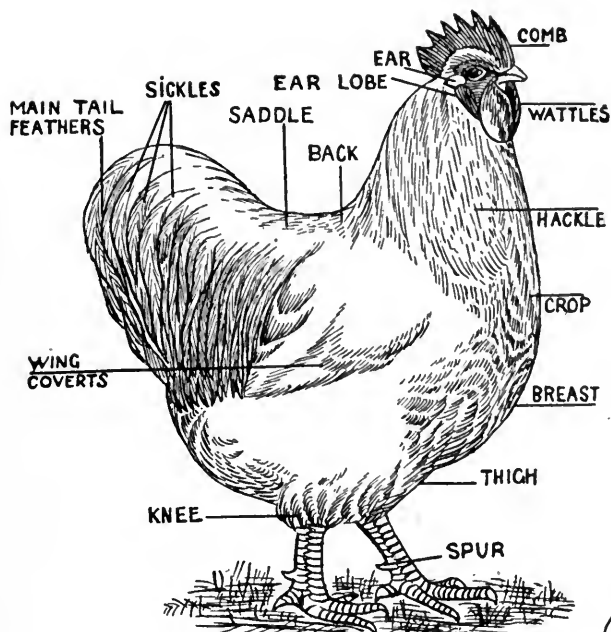
Inventory Sheet.—This sheet is used at the beginning of each year to take a complete inventory of the value of the equipment, feed, stock, etc. Each item should be listed at its value the time the inventory is taken. If buildings are well constructed allow about 5 percent deterioration for each year they have been built. The deterioration on incubators that have received good care is about 10 percent. The inventory does not necessarily need to be taken on January 1st; October 1st or November 1st will do just as well.

INVENTORY, JANUARY 1, 1918

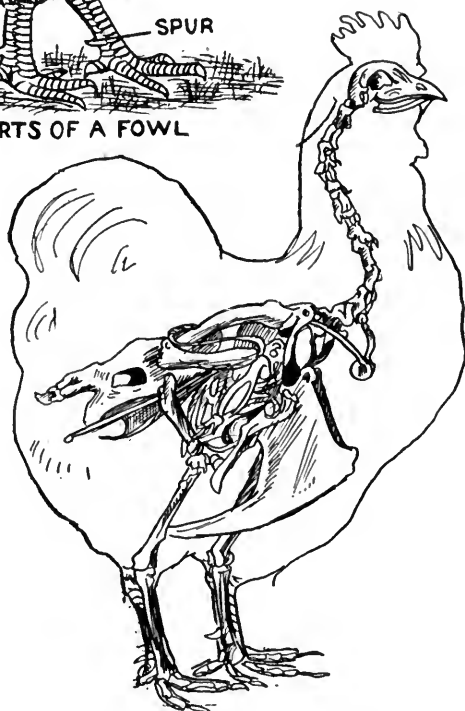
1 henhouse, 15 by 40 feet	\$150.00
1 240-egg incubator	24.00
2 indoor brooders	17.00
2 colony houses, 8 by 8 feet each	45.00
Miscellaneous—feed troughs, pails, pans, etc.	15.00
1 bushel wheat	2.00
1 bushel corn	1.00
100 pounds beef scrap	3.50
150 pounds bran	2.50
50 barred Plymouth Rock hens	50.00
50 barred Plymouth Rock pullets	75.00
5 barred Plymouth Rock cock birds	10.00
7 barred Plymouth Rock cockerels	14.00
Total	\$409.00

INVENTORY, JANUARY 1, 1919

1 henhouse, 15 by 40 feet; 5 per cent deterioration	\$142.50
1 240-egg incubator; 10 per cent deterioration	21.60
1 150-egg incubator, new	18.00
2 indoor brooders; 10 per cent deterioration	15.30
1 indoor brooder, new	8.00
2 colony houses, 8 by 8 feet each, repaired; no deterioration	45.00
Miscellaneous—feed troughs, pails, pans, etc.	15.00
2 bushels wheat	3.00
1 bushel oats .....	.70
100 pounds bran	1.80
50 pounds beef scraps	1.80
27 barred Plymouth Rock hens	27.00
95 barred Plymouth Rock pullets	150.00
2 barred Plymouth Rock cock birds	4.00
12 barred Plymouth Rock cockerels	26.00
Total	\$479.70



PARTS OF A FOWL



SKELETON OF A FOWL

TREATMENT FOR DISEASES OF CHICKENS.

(Value of Prevention.)

As a means of profit, poultry raising can be made successful only by maintaining the most vigorous campaign against disease. The best way to carry on this campaign is by preventive measures. Too few people ever think of disease until it makes its appearance, and to ignorance, carelessness and lack of forethought in this respect, is due, to a large extent, the prevalence of poultry diseases.

Fowls are often affected by a number of diseases which spread rapidly through the flock and kill a large part of the birds. They are also infested by different kinds of parasites which live in the crop, intestines, or stomach of the bird and on the surface of the body. These parasites are injurious as they take a part of the nourishment which should be used by the fowl to produce eggs or to put on flesh, and also because their biting and their movements cause irritation to the parts which they attack.

Important Conditions to Consider.—The most important conditions which the poultryman has to consider in an endeavor to keep his fowls in a healthy condition, are the larger parasites to which reference has just been made which causes weakness and loss of flesh and the contagious diseases, which are caused by vegetable and animal germs. These parasites and germs should be kept out of the flock by preventive measures. Disease can be prevented much more easily and with far less expense than it can be cured. A person should therefore study diseases not so much with the idea of knowing how to cure them as knowing how to prevent them.

Many times medicines can be advantageously applied or given to fowls, however, as a rule, if the patient is not a very valuable bird, it is better to kill it because the time and work required for treatment is worth more than the bird. Again a sick bird may be affected with some contagious disease which may spread through the entire flock before it is recognized. Another reason for killing sick birds is that they are more susceptible to disease than the other birds of the flock, so they should be culled out in order to establish a strong flock, capable of resisting disease.

Preventing Disease.

Elements Necessary.—Stock with vigorous constitutions; proper feeding and housing; absolute cleanliness; start chicks right.

Breed for Health.—"Like produces like." Do not expect birds with weak constitutions to produce healthy chicks. Breed from the best stock you have. **Breed for health.** Health gives one a solid bed-rock foundation upon which to build a strain well fitted to develop all the other desirable qualities. The tendencies to certain weaknesses are readily transmitted from parent to offspring. When these tendencies are handed down from generation to generation they become more firmly fixed. The strong, vigorous birds should be mated and the weak strains eliminated.

Indications of Health.—Use the birds with bright eyes; bright, smooth, well-kept plumage; red comb; those that are alert, active, and have a keen appetite. Examine the body to see that it is free from defects and deformities, especially the legs. The legs should be bright, clean, clear, and well formed.

Legs Show Condition.—The legs of a fowl indicate its condition as much as the pulse of a person. If the veins on the legs are prominent, if the legs feel dry and hot to the touch, especially if this condition is accompanied by a hot breath and dry mouth, separate the bird from the others until you find out what is wrong.

Do Not Breed "Cured" Fowls.—Birds that have been sick are dangerous as breeders. They are necessarily the weak ones, besides there is always the danger of their not being entirely cured. Some taint often remains which may transmit a predisposition to disease to the offspring.

Feeding to Prevent Disease.—Be sure that the chickens receive the kinds of feed and the right amounts to supply their needs. In winter they must be given the feeds that take the place of what they pick up on the range during the summer months. Even in summer they do not always get all they need. This must be supplied them if necessary.

Housing to Prevent Disease.—See that the fowls have plenty of fresh air but avoid drafts and damp coops. Do not allow the birds out when there is snow on the ground. Colds lead to other troubles and result in loss to the owner. Besides fresh air the fowls also need sunlight in order to be healthy. If possible, the coop should be so situated that during the day, sunlight penetrates to all parts of it. Fresh air and sunlight are purifiers and natural disinfectants. This applies to all poultry buildings. Many brooder houses which seem to be veritable death traps and which have proven unsatisfactory, will work well if they are changed so as to let in the sun whenever possible. Of course the chicks should be able to get in the shade when they choose. Feeding and housing play a large part in keeping the birds healthy and vigorous. Give them a home.

Cleanliness in Preventing Disease.—If everything about the place were kept clean, there would be little trouble from diseases in poultry. Keep clean litter on the floor of the poultry buildings and clean the coop thoroughly at least once a week. Have a dropping board to catch the manure at night. This should be cleaned at least twice a week in summer. Scald out the drinking basins to keep them free from germs and clean the hoppers. Do not keep poultry on the same ground season after season. The ground becomes infected and harbors

insects and disease germs. Old ground should be treated to kill these germs by applying a good coating of freshly slaked lime to the entire surface and then plowing a few days afterwards. It may then be cultivated 3 or 4 times with intervals of a week and then sowing it finally to rye, oats or other grain. The greater part of the germs will be destroyed in a few months, however, if possible the ground should be left unoccupied by fowls through the winter, as the freezing and thawing is more effective in killing the germs than continued warm or cold weather. Keep the coop disinfected and whitewashed. Whitewash once a year at least. In the spring or fall is a good time.

Start Chicks Right.—Be sure that the chicks are not infested with germs at the start. If a hen is used to hatch the eggs, she should be free from lice and mites. Keep her dusted with a good insect powder. Be sure the nest is free from vermin. Avoid putting eggs to be hatched in any packing such as oats, chaff, or cut straw which may be musty or moldy; wipe the eggs with a cloth wet in a solution of 70 per cent. to 80 per cent. alcohol. If an incubator is used have it thoroughly cleaned and disinfected. The young chicks should be free from parasites and injurious germs of all kinds. To keep them in this condition put them in clean, disinfected brooders, and allow them to run only upon that ground which has been free from poultry for several years. If this cannot be done, disinfect the soil as mentioned above.

By beginning this way, a flock can be had practically free from parasites and disease germs, but to keep them in this condition frequently clean and disinfect the premises. There are several reasons for this. First, the germs of contagious diseases may be brought to the place by pigeons or other birds which fly from one poultry yard to another, or by rats or mice; second, certain germs are generally present in the intestines of healthy birds and are scattered with the manure, which, if permitted to accumulate and become very numerous may cause outbreaks of disease; third, grounds for the poultry are seldom entirely free from infection with the eggs of parasitic worms and the spores of disease-producing microbes. To keep these parasites and germs from developing and increasing their numbers, the feed troughs and drinking fountains should be washed every day or two with boiling water or other disinfectant and the brooders and runways thoroughly disinfected. One should study diseases to know how to prevent them. Eliminate the cause of the disease and the disease itself will soon disappear.

SIMPLE REMEDIES.

(Their Uses and Doses.)

Following is a list of simple remedies and a few articles which the progressive poultryman should include in his medicine chest. A small glass, graduated into ounces for measuring liquids; a glass tumbler in which to mix remedies; a teaspoon; small pair of tweezers; medicine dropper, small oil can with which to apply roup or cold cures by direct application when several birds are affected; sharp pen knife. All powders should be removed from the packages, placed in small, air-tight cans and neatly labeled.

Medicine	Strength of Dose	Disease Used For
Castor oil.....	1 teaspoonful.	Diarrhea, indigestion, etc.
Epsom salts.....	20 to 30 grains in teaspoonful warm water.	Constipation, liver disease, diarrhea.
Calomel.....	1 to 2 grains.	Constipation, diarrhea, liver disease.
Quinine.....	1 grain.	Fever, colds, roup.
Aconite.....	1 drop.	Fever, colds, roup.
Turpentine.....	(Internal) 5 to 10 drops in 1 teaspoonful castor oil.	Worms, colds, sore throat.
	(External).	Bruises, skin injuries, cramp and rheumatism.
Carbolic acid.....	*1 to 5 percent solution.	Roup, colds, diphtheria, injuries and cuts.
Permanganate of Potash.....	$\frac{1}{2}$ to 2 percent solution.	
Hydrogen peroxide.....	50 percent.	
Creolin and sweet oil.....	Equal parts of each.	Dressing cuts and injuries.
Iodine.....	Tincture.	Reduce swellings.
Sweet oil.....	1 ounce.	Cramp, rheumatism, keeping legs polished.
Ointment:		
Kerosene.....	1 part.	Scaly legs, ticks, mites, lice.
Sulphur.....	1 part.	
Lard.....	2 parts.	
Kerosene.....	.....	Scaly legs.
Lice powders.....	.....	Mites, lice.
Tincture of iron.....	In drinking water, enough to color.	Tonic.
Carbonate of iron.....	Little in mash, during molting time.	Produce gloss in feathers.
Potassium sulphide.....	Small amount in drinking water.	Cholera.
Copper sulphate.....	2 drams in 1 gallon water.	Intestinal disinfectant.

* A 1 percent solution—(approximately) $1\frac{1}{4}$ teaspoonfuls to 1 pint water. This is accurate enough for practical purposes. By figuring from this any of the dilutions wanted can be easily prepared.

Apoplexy.

This disease is usually caused by the rupture of a blood vessel brought about by too high feeding, sudden fright, violent exertion or straining in laying eggs. Birds are sometimes found dead in the nest.

Treatment.—There is usually no previous warning or symptoms and in most cases treatment is impossible.

If the bird is still alive, pierce a vein underneath the wing causing the blood to run freely and reducing the blood pressure on the brain. In this way one will usually produce a cure.

Regulate the diet to reduce the fat and give plenty of exercise.

Aspergillosis.

This is a disease which exists more often than is expected. It attacks the respiratory or digestive organs of fowls. In adults, the disease may be mistaken for tuberculosis and in chicks for white diarrhea. Aspergillosis of chickens is dealt with under brooder pneumonia.

A fungoid growth in the wind pipe and bronchial tubes, sometimes extending to the lungs and liver. Infection may be due to musty hay, straw or grain.

Symptoms.—Fowls gradually lose weight, mope and die without any pronounced ailment except difficulty in breathing and extreme weakness.

Preventive Treatment.—This is a most difficult disease to cure. It can be prevented by feeding no musty grain and giving only clean, bright chaff or straw to scratch in.

Sometimes affected fowls may be saved by applying flowers of sulphur or tincture of iodine to the patches seen in the mouth and throat and causing the birds to inhale the vapor of tar water or turpentine. Tar water is obtained by adding two tablespoonfuls of wood tar to a quart of warm water and letting the mixture stand a few hours. Then the birds are taken into a closed room where the tar water is poured, a small quantity at a time on a hot brick or stone until the atmosphere is charged with the vapor.

Brooder Pneumonia.

This is an inflammation of the lungs caused by the growth of the aspergillus fungus in the smaller air tubes and in the lung tissue.

Symptoms.—The symptoms are very similar to those described in white diarrhea and the disease may be easily mistaken for the same. However, the breathing is more rapid and difficult and is sometimes accompanied by sounds due to obstruction of the air tubes. The white diarrhea is usually present in the lung disease as well as in the intestinal infection.

Treatment.—The sick chicks can seldom be cured and so all efforts should be directed toward prevention. The measures mentioned for the prevention of white diarrhea are applicable to brooder pneumonia. It is probable this disease is

generally caused by failure to maintain proper cleanliness and ventilation. Care should be taken to disinfect the incubator and brooder thoroughly in which the chicks are to be hatched and reared.

Bumblefoot.

Bumblefoot is caused by some bruise or injury such as jumping from a high roost upon some hard substance or by stepping on bits of glass or splinter.

Symptoms.—Inflamed condition of the bottom of the foot. Usually pus forms under the skin in the form of an abscess. As the pressure is increased, there is a tendency of the pus to work out into other parts of the foot and leg. The fowl limps and is inclined to stand on one foot.

Treatment.—Keep the fowl in a clean, dry place and do not allow much exercise until the wound heals. It is best to bandage the foot and dress with fresh vaseline each day. Wash in strong vinegar or paint with iodine. If pus has formed, drain it and wash thoroughly with peroxide of hydrogen. After this apply 30 parts vaseline and one part iodoform.

Canker.

Ill smelling quarters and feeding unclean and diseased foods produce canker in fowls. Musty or "rotten" grain is also apt to induce the trouble.

Symptoms.—Sores on the head and often in the mouth and throat, with a discharge of matter from the eyes.

Treatment.—Cleanse the sores with one-third peroxide to two thirds water three times daily. Then apply lard mixed with sulphur. Mix up a light solution of permanganate of potash and add to the drinking water, giving them no other water to drink.

Catarrh or Bronchitis.

Catarrh or irritation of the air passages affecting the tubes of the lungs, is termed bronchitis.

Symptoms.—It can be detected by a whistling sound in the breast. The bird acts stupid and may gasp for breath. In bad cases breathing is difficult.

Treatment.—Place the sick fowl in a dry room where there is plenty of fresh air.

Aconite.—Give twenty drops of tincture of aconite in a quart of drinking water. In mild cases this will be found sufficient provided the sanitary conditions are as they should be. Flaxseed tea is also recommended. If taken in time, 10 drops of turpentine in a teaspoonful of castor oil will relieve. Give one teaspoonful of glycerine in which four drops of vinegar has been dissolved. Repeat each night for a week. Mix equal parts of vinegar and water. Give one teaspoonful two or three times a day.

Catarrh of the Crop.

Eating putrifying or stale food or some poisonous matter.

Symptoms.—Fowls are found to have distended crops which upon ex-

amination are found to be filled with gas and foul smelling fluid but very little food. The bird becomes sluggish, the feathers rough and the comb dull in color.

Treatment.—Empty the crop by holding the head downward and carefully pressing the contents out through the mouth. Giving one-tenth grain tablet of bichloride of mercury dissolved in one quart of drinking water. Weed soft, easily digested food.

Catarrh of Stomach (Gastritis).

Enlargement or swelling of the food passage near the gizzard. It is seldom met with except in connection with catarrh or inflammation of the crop. It may be caused by overfeeding, eating decomposed food or other poisonous matter.

Symptoms.—Lack of appetite, bowel trouble, diarrhea one day and constipation the next, some fever and general weakness.

Treatment.—Do not feed irritating food. Omit from mash all bran and mix with clover tea. Add one-tenth of a grain of arsenite of copper to each pint of drinking water.

The irritation may be allayed by a little rice boiled in the drinking water.

Chicken Pox or Sore Head.

Chicken pox is strictly a contagious disease. It may be introduced by an infected bird; by lice or other insect pests.

Symptoms.—Small, scabby, wart-like growth varying in size from a millet seed to that of a pea, on the comb, wattles and ear lobes.

Treatment.—Mild cases of this disease may be successfully treated by local applications. Isolate affected fowls.

Apply tincture of iodine after removing the scabs. Or creolin 2 percent solution may be used instead of the iodine.

Apply a solution of boric acid to the affected parts. Some prefer carbolated oil to watery solutions. If there is inflammation of the eyes, the boric acid solution may be used as a wash.

Bathe head and eyes with equal parts water and witch hazel.

For the eruption there is nothing better than common vaseline. Feed a mash of one-third clover mixed with boiling milk. Avoid exposure to cold and wet.

Cholera.

Cholera of poultry is a virulent, usually fatal, contagious disease. Many simple ailments of poultry are accompanied by diarrhea, but the poultrymen should bear in mind that a troublesome diarrhea is not always cholera.

Cholera is caused by infection, brought on usually by food or drink which has been infected by the discharges of diseased fowls. The germs often gain entrance to the body by inhaling the dust in coops which have not been properly disinfected or by eating the flesh of fowls which have died of the disease.

Symptoms.—Loss of appetite, great thirst and high temperature. If a fever thermometer is placed next to the flesh under the wing, it will often register 110 degrees. The crop is usually distended with food which cannot pass owing to the paralysis of that organ. Sleepiness which may last until death. A rapidly fatal disease, always accompanied by copious, yellowish or deep blue green diarrhea. Infection of a large number of birds in one flock. Caution: A combination of indigestion and lice produce symptoms which are very much like those of cholera. Nine-tenths of the reported cases of cholera are not that disease at all. Get rid of the vermin, supply charcoal, grit, feed less corn and you have the best cholera remedy there is.

Treatment.—If sure your chickens have cholera, the treatment should mainly be preventive. Observe cleanliness in every way. Do not use eggs for hatching unless you know they are from healthy stock. Isolate all suspected cases as soon as found. Give these birds a few drops of creolin in their drinking water, just enough to turn it slightly milky—or give them drinking water in which has been dissolved one-tenth of a grain tablet of corrosive sublimate to a quart of water. If they develop marked symptoms of cholera, they had better be killed and cremated at once. Kill by strangulation or the blow of a club. If blood is drawn it will be a means of infection for other fowls. Spray the building with a 5 percent solution of carbolic acid and then whitewash it.

A good home remedy in any case of diarrhea and often in mild cases of cholera, is to drop twenty to thirty drops of spirits of camphor on sugar and dissolve the whole in a pint of water; allow no other drink. As a diet give them stale bread soaked in scalded milk and well seasoned with pepper.

A Prescription.—In use for twenty years and found to be one of the most successful remedies ever tried: Carbonate of iron, 8 ounces; pulverized golden seal, 1 ounce; pulverized rhubarb, 3 ounces; pulverized capsicum, 3 ounces; flowers of sulphur, 8 ounces; pulverized charcoal, 4 ounces. Mix thoroughly together. Keep in air-tight can. For chicken cholera make a pill of this remedy the size of a small pea and force the sick bird to swallow by forcing the mouth open and dropping into the throat. As a preventive, put 1 teaspoonful in feed enough for twelve hens. Use this three times a week. It will also increase egg production fifty percent.

Coccidiosis (Brooder Pneumonia in Chicks—Blackhead in Turkeys).

This disease germ does not usually affect adult fowls seriously but causes severe loss in chicks and turkeys. In chicks it is known as brooder pneumonia and in turkeys as blackhead.

The same germ causes this disease that produces blackhead in turkeys. Pigeons are particularly susceptible to it and are often responsible for the outbreak in poultry yards as it is spread by contagion. The germ (coccidia) multiply very rapidly in the intestines of the diseased fowls and are discharged with the droppings and carried on the feet to the drinking and feed troughs unless they are well protected.

Symptoms.—When adult fowls are attacked, the symptoms are stupidity, laziness and sometimes diarrhea. The fowl loses weight although the appetite is retained for a time.

Treatment.—Put three grains of copperas to one quart of water, or fifteen grains of catechu to one gallon water and give the birds to drink. This has been a very successful remedy. They should also be given a dose of calomel (three-fourths to one grain) or two to three teaspoonfuls of castor oil occasionally.

Give doses of castor oil containing 5 to 10 drops of turpentine with each dose. Disinfect the premises thoroughly with a 10 percent solution of cresol. Burn the bodies of all birds that die.

Crop Bound.

Crop bound is caused by food swelling and forming a hard mass in the crop. Fowls deprived of the necessary vegetable diet often eat the litter, bringing on this condition. The absence of grit in the food has the same result. Sometimes a quantity of green leaves or grass is eaten by the fowl and becomes packed in the crop, making the passage of food impossible.

Treatment.—In some cases an operation is necessary. However, the following treatment is recommended: Sweet oil, olive oil, or fresh melted lard should be poured down the throat; from one-fourth to one-half ounce of any one of above remedies. With the hand, work the contents of the crop so as to break up the hard mass. Then give the bird warm water to drink and soft, easily digested food for a few days.

Diarrhea.

Indigestion caused by food which is too laxative or food which may be partly decomposed. A cold may also be a cause.

Symptoms.—Looseness of bowels and staining of feathers around the anus with excreta.

Treatment.—Give Epsom salts, 20 to 50 grains in food or warm water.

Give a teaspoonful of castor oil. Change diet if food is suspected. Often no treatment is necessary but it is not wise to neglect a mild case for fear of the development of "Severe Diarrhea or Epidemic."

Diphtheria.

In diphtheria we find some of the symptoms of roup or contagious catarrh, but it differs from these by raised patches of whitish or yellow skin which invades the throat and mouth, and sometimes appears like sores or ulcers on the face, comb, nostrils and eyes.

Diphtheria of fowls is strictly contagious and probably never develops as the result of cold or dampness. The contagion is spread through mucus which escapes from the nostrils or that which is forced out by sneezing or coughing. When the disease is present, the feeding troughs, drinking pans, etc., are quickly infected and thus the disease is conveyed to the well birds.

Symptoms.—The symptoms first show themselves by irritation or inflammation of the surface of the throat, mouth, nostrils or eyes, sometimes ex-

tending from the air tubes to the lungs or from the gullet to the crop. The poison which is produced by the growth of the microbe beneath the false membranes is absorbed and affects the nervous system causing depression and sleepiness. At this time, which may be three to five days from the appearance of the first symptoms, the condition is very serious. The breathing is so obstructed that hardly sufficient air can be inhaled to support life. The head is swollen, there is considerable fever and an exhausting diarrhea sets in. There is loss of weight and death soon follows.

Treatment.—The treatment of diphtheria requires much time and patience and unless the fowl is valuable, does not pay. It is better to kill and burn those affected, disinfect the houses and in that way stop the contagion as soon as possible, even if the whole flock must go. If the birds are to be treated, remove them from the flock. Make a swab of cotton tied on a stick and swab the mouth with hydrogen peroxide. Remove any of the growths that come away easily.

A solution which gives good results is 35 grains of chlorate of potash, two grains of salicylic acid in one ounce of water and 1 ounce of glycerine. This to be applied to the spots three or four times daily.

A solution consisting of one and one-half ounces boric acid and one ounce of powdered borax dissolved in one quart of water and applied warm, is good. The two last mentioned solutions may be used as an eye wash or injected in the nostrils. Disinfect the rooms where the sick birds stay daily with a 5 percent solution of cresol or carbolic acid.

Diseases of the Liver.

The liver is affected by several diseases. The most common are connected with digestive disorders. Others are due to a specific disease such as tuberculosis or coccidiosis.

The diseases which are due to indigestion are congestion, inflammation, fatty or enlarged liver and atrophy of the liver. While there is a distinct difference in these diseases, the methods of treatment are very much the same.

Wrong feeding is usually the cause of this trouble. The fowls may be eating too much heat-producing food and not enough green food.

Symptoms.—The first symptoms are a watery diarrhea. The affected birds show no appetite and lack ambition to move around. Later there is an increased desire for water and the fowls lose weight rapidly.

Treatment.—The return to rational food is the first step. Give more green food. Make the mash as largely to cut clover as the birds will eat. Drop out some of the flour and corn meal. Encourage exercise. Give as scratching material waste from hay mows. If it is warm weather, give the birds access to a clean grass run.

At the first appearance of liver trouble, give a teaspoonful of castor oil. This will be effective if given in time.

For worms, add one-half teaspoonful of sulphate of magnesia to the drinking water of each bird.

Dropsy.

It may be due to a sluggish condition of the circulation. Overfeeding with little exercise tends to bring on this disease. Dropsy is frequently the manifestation of some other disease.

Symptoms.—This disease usually shows itself in the abdomen where water collects and causes a distention. The feet and legs are swollen.

Treatment.—Unless the disease is caused by some organic trouble, plain food, green vegetables and a dose or two of castor oil will probably cure it. As the legs reduce in size, give more exercise to stimulate the functions of the whole body. A solution of one teaspoonful of nux vomica to two quarts of drinking water is valuable as a tonic. If the fowl has some other organic trouble, it is best and most merciful to kill it.

Dysentery.

Some bacterial or other specific infection of the intestines. It may originate from a filthy condition of the poultry yards, foul floor, filthy water or decomposed food.

Symptoms.—Extreme looseness of the bowels with more or less blood in the discharge. The bird shows weakness and loss of appetite.

Treatment.—First place the yards in a sanitary condition. Isolate the sick fowls. Give 6 to 8 drops of chlorodyne on a small piece of bread. The food should be non-irritating for a few days. Feed wheat rather than corn for a week.

(For small chicks.) Give all they will drink three or four times a day of scalded milk to which has been added a little grated nutmeg.

Feed boiled rice sprinkled with fine bone meal.

Egg-bound.

Egg-bound is a condition of the egg passage, affecting most frequently the heavy breed of hens.

The cause is attributed in most cases to an over fat condition. This produces pressure on the egg passage causing difficulty in the proper function. Sometimes the muscles are weakened by streaks of fat which cause straining, the weak walls give way permitting the egg or its contents to pass into the abdominal cavity. This condition produces inflammation.

Symptoms.—The fowl thus affected has a constant desire to strain. The violent strain sometimes ruptures a blood vessel causing sudden death.

Treatment.—It is generally more merciful to kill the fowls as treatment is tedious and painful.

Hold the fowl's vent over steam from boiling water and then pass a finger up the vent. Have the finger well oiled. If the case is bad, pierce the egg and remove the contents, then break the shell and withdraw the pieces. Be sure and leave none of the broken shell behind.

Egg Eating.

The habit of egg eating may be caused by the nests being low and near the light. The hens get into them, scratch around and break the eggs and thus form the egg-eating habit. Soft shelled or broken eggs about the yards may be a cause.

Treatment.—Place all nests at least 2 feet above the floor and in a medium dark place. Remove all signs of broken eggs. The fowl detected should be removed to a different place.

Dump a pail of egg shells in the yard and mash some of them. One dose should cure the egg eaters. If it does not, get more and keep them constantly on hand. "This is a positive cure for egg eating" writes a raiser who ought to know.

Remove the inside of an egg through an opening in one end. Mix the contents with a little pepper; put them back into the shell and stick a piece of white cloth over the broken part. Put this where the egg eating hen can peck it. After she has tried to eat it she will seldom bother about eating her eggs again.

Feather Eating.

It is usually due to a poultryman's carelessness in some way. Overcrowding, improper feeding or lack of exercise are prime causes of these habits.

Bare patches and injured feathers are signs of feather eating. It is more common during the molting season.

Treatment.—See that the birds get all the animal food they need. Keep them busy scratching for their food. Isolate the offender for a time.

Drop a piece of sulphate the size of a small cherry in the throat of the bird. Repeat the third day.

Give the fowls plenty of salt in their feed and they will seldom acquire this habit.

Boil oats till soft and plump, and into a pail of this mixture stir a good pinch of salt and one quart of beef scrap. Feed this to the birds.

Mix some boiled finely cut cow's liver with oats and feed every morning.

Give sour milk to drink and cover the floor with clover chaff to keep the fowls busy scratching.

Gapes.

Gapes is a disease which develops in small chicks and is caused by the presence of a parasite worm which attaches itself to the mucus lining of the windpipe.

The worm which causes this disease is sometimes called the red worm or the forked worm because of its color and the fact that the male and female are firmly grown together in forked shape. The heads of both are attached to the mucous membrane of the windpipe, sucking the blood and causing an irritation and obstruction of the passage to such an extent as to interfere seriously with the breathing.

The symptoms are more often observed in chicks from ten days to four weeks old. The affected birds are found gaping, sneezing or coughing with an effort. When badly affected, the bird shakes its head frequently as if suffocating; stands in a "dumpish" position with wings drooped and mouth open.

Treatment.—All sick birds should be removed from the well ones. Coops and runs should be thoroughly disinfected. To the coops apply an application of hot whitewash. The ground or runs should be well limed with air-slaked lime, spaded up and should be sprinkled with one of the following solutions: A two percent solution of sulphuric acid in water or two ounces of copperas (sulphate of iron) dissolved in a bucket of water, or a solution of permanganate of potassium in water, half an ounce of the crystals in a barrel of water; or a strong solution of creolin, two tablespoonfuls in each gallon of water. The ground should be well sprinkled with one of the above solutions after infected chicks have been removed. Then plow or spade and sprinkle again. Repeat this disinfection whenever infected chicks have been on the ground. Scald all drinking vessels used by sick birds. Burn all chicks which die of gapes.

Preventive Treatment.—A piece of copperas placed in the drinking water is said to prevent contagion. Tincture of asafetida, a teaspoonful in a quart of water, is used for the same purpose and has a curative action. Three drams of salicylate of soda in a quart of drinking water is also recommended as a preventive.

A farmer in the tobacco raising section of western Ohio was bothered considerably with the loss of a number of small chickens from gapes. One day he was burning some tobacco stubs and a number of the gaping young chicks walked into the smoke smudge. He noticed that as they came out they were coughing and appeared to be greatly relieved. Deciding to experiment he placed some others that were almost dead in the smoke for a short time and then placed them in the open or fresh air. They also coughed and looking closely he found numbers of dead gape worms on little chips on the ground. He concluded that the smoke killed the gapes which were smothering the chicks and, the fresh air revived them causing the worms to be coughed from the throat.

Just put a small cover of coals in a basket or small box the size depending on the number of chickens, and cover it with a screen. After placing the affected chickens in the box place some dampened tobacco upon the coals. This will cause a smudge and the chickens will have to inhale it. Cover the box for a minute or two. When the chickens begin to weave about or fall over take them out into the fresh air which will revive them and start coughing. The smoke will kill the worms, the coughing will expel them and the chicken is relieved. Other chickens picking up the dead worms cannot be affected with the disease.

Put a small quantity of kerosene into the pan of drinking water accessible to the chickens with gapes. Put several pieces of camphor gum in the drinking pan.

Going Light.

This trouble may be due to insufficient or poor food, lack of exercise or poorly ventilated houses. Lice or mites may be contributing cause, and it may be due to some such disease as tuberculosis, aspergillosis or worms.

Symptoms.—"Going Light" is a term applied to fowls which lose weight rapidly, become weak and emaciated without any apparent reason. When lifted they seem to weigh little more than the feathers with which they are covered.

Treatment.—First, if possible, discover the cause. If no defect is found in the food and the fowls and houses are free from lice, much time may often be saved by killing one or more of the birds and making a post-mortem examination to discover if the trouble is caused by some specific disease. Open the intestines the entire length to learn if there are a sufficient number of worms to account for their condition. If any diseased condition is found, follow the treatment recommended for such disease found elsewhere in this department.

Indigestion.

While this is not a disease, it leads to many.

The cause of indigestion is traceable to improper feeding, the lack of grit and to loss of vigor in the flock.

Treatment.—A well balanced ration, not too much bulky food, clean, fresh water, birds kept in a dry, well ventilated house and compelled to take plenty of exercise, will ordinarily put back into condition a deranged digestive tract. Green food should be given poultry once every day in the year. It invigorates the liver, sends pure blood into the vital organs of the system, and will keep them in better condition than all liver tonics combined.

Inflammation of the Egg Passage.

Inflammation of the egg passage may occur in connection with an egg-bound condition. This condition is usually the result of too much fat and is more frequently found in the larger breeds. Inflammation may be due to the use of some of the egg-foods advertised to increase egg production and which have an irritating effect if used too long. Many of these cases are due to a retained egg that might be removed. The eggs are large, the passage is fatty, an egg is retained and inflammation follows.

Symptoms.—There is a constant desire to strain. The violent strain sometimes ruptures a blood vessel and causes sudden death. The feathers of the bird are ruffled and the wings droop as though there were a relaxing of the muscles. The vent of the bird is hot, red and in motion. The temperature of the bird drops and death follows from the extended inflammation.

Treatment.—If the disease proceeds from the retained and perhaps broken egg, it must be removed at once. Oil the finger and carefully insert in the passage. If the broken egg is within reach, it can, with patience, be removed. If too far away, use injections of olive oil repeatedly. This will have a soothing effect and tend to remove the broken or retained egg.



Crop Bound



SORE HEAD—Chicken Pox



White Diarrhoea



Bumblefoot



Gapes



Gape Worms

The broken egg being removed, the passage should be syringed with warm oil containing a few drops of carbolic acid and 20 to 30 grains of sulphate of magnesia administered and repeated two or three times.

Influenza or Cold.

Influenza, or grippe, is generally applied to a severe cold that has no symptoms of roup.

Colds most frequently occur in wet weather and among poorly housed fowls.

Symptoms.—The most common symptoms are a “roupy cold” without the “roupy smell” which may or may not be accompanied by a watery diarrhea. The fowl is dumpish and feverish, the eyes and nostrils are watery and there is much sneezing; no patches on the throat.

Treatment.—Warm housing and protection from cold and wet. Give 1 grain quinine to an adult fowl. It is well to isolate the birds as the early stages of roup are sometimes mistaken for a simple cold. The fowls are more liable to contract roup when suffering from a cold and on this account, should be isolated and examined often.

Use equal parts of hydrogen peroxide and water as a wash for mouth and nostrils.

Put 20 drops of camphor in a teaspoonful of sugar, and dissolve in a pint of water. Give this as the birds' only drink. This often checks the trouble at once.

Red pepper given with the food is recommended.

Wash the eyes and nostrils with 3 percent boric acid in water or equal parts of witch hazel and water.

Immerse the fowl's head in a strong solution of permanganate of potash. This is an excellent remedy.

Leg Weakness.

Leg weakness is seldom seen except in a flock from three to six months old. The cockerels are more apt to be affected than the pullets. One of the causes is over feeding of fat producing foods, thus producing more weight than the legs can properly support. The larger the variety, the more tendency there is to leg weakness through feeding. Another cause for leg weakness is the feeding of too little bone and muscle-forming foods. Chicks kept on board floors too long and not given soil to run on are liable to leg weakness.

Symptoms.—The first symptom is a slight weakness of the legs in walking. The gait is unsteady and in a few days the fowl may be found sitting while eating and tries to avoid walking. During the first few days, the appetite is not affected but as time passes, the bird is slow to feed and fails to get its share of grain. It is driven about and picked at by the other fowls and at last becomes thin and louse ridden.

Treatment.—Reduce the quantity of fat producing foods to a small amount. Do not feed corn or corn meal. Feed only three times daily. If possible, put the weak birds in a place by themselves. Feed steamed cut

clover as a noon meal in summer or winter. As in all cases, clean water and houses go with good care. Rub the legs with arnica and add half a teaspoonful of tincture of nux vomica to each quart of drinking water. Do not confuse leg weakness with rheumatism. In the latter disease, there is always swollen joints. A good bran or meat meal containing at least one-fifth bone should be made part of the morning mash, proportion: One part meal to six of grain and clover.

A good food is to give bran, wheat and oatmeal; skim milk instead of water. Cook oatmeal and when cool add 30 drops of diluted phosphoric acid for each bird affected and give twice daily. Give from 3 to 6 grains citrate of iron each day as a tonic.

One teaspoonful of air-slaked lime daily to each five chickens has proven good.

Lice.

Lice are almost always present in small numbers and may become a serious pest if neglected.

Symptoms.—The fowl shows signs of irritation, cannot rest and looks unthrifty. Sometimes setting hens leave their nests before hatching time, and upon examination it will be found that the presence of lice is the cause of it. They will be found largely under the wings, about the vent and on the head and neck. It is with young chicks that lice work the worst havoc. They are usually found under the throat and on the top of the head.

Treatment.—Lice are found deep among the feathers and any treatment to be successful must reach them. Dust the fowls with some good lice killer. Persian insect powder, or powdered sulphur are very successful. Use a box with a perforated cover and dust the fowls after they have gone to roost. Hold the hen firmly by the legs, head downward, and sift the powder through the loosened feathers. Dust at least three times about a week apart. Begin the fight early. There is no harm in giving the fowls an application even in midwinter. As they are seldom entirely free from lice this will keep them from getting a start. Dust setting hens with the powder before putting them on the nest.

For young chicks make an ointment of sulphur and lard, rub under the throat and on top and back of the head.

Rub a little sweet oil, vaseline or lard where they are.

Road dust 2 quarts, and tobacco dust 1 pint, or well sifted hard coal ashes may be substituted for the road dust and Persian insect powder or flowers of sulphur may be used in place of tobacco dust. The principal thing is to have the ingredients mixed to a very fine dust.

One teaspoonful of sulphur in the feed for 20 chicks or a tablespoonful for 20 adult fowls is good. A large quantity will not hurt them. Repeat every day until the lice are gone. Some say not to feed sulphur in wet weather but it will not hurt the chickens.

Put a few drops of kerosene (coal oil) on hens' wings and in hovering the chicks they will get sufficient on them to destroy the lice.

Limber Neck.

Limber neck is a symptom of diseased conditions rather than a distinct poultry disease.

The condition is due to the absorption of poison which acts upon the nervous system and causes paralysis. It is generally associated with indigestion or worms. It is very similar to ptomaine poisoning.

Symptoms.—The muscles of the fowl's neck become so relaxed they cannot support the head, and the fowl stands or squats with the head resting on the ground.

Treatment.—For adult fowls give from one to two teaspoonfuls of oil of turpentine mixed with the same amount of sweet oil. For small chicks give a mixture of from two to ten drops of each. In one-half hour mix one teaspoonful ginger with one-half cup hot, sweet milk slightly sweetened. To adult fowls give one to two tablespoonfuls every hour or two and to chicks one-half to one teaspoonful.

Fifty to 60 grains of Epsom salts or three or four teaspoonfuls of castor oil to a grown fowl.

Mix equal parts of lard, ginger, mustard and cayenne pepper. Form into flat pills the size of a dime and give one of these every three hours if necessary.

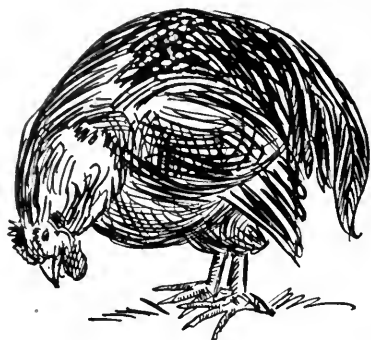
Mites.

These parasites breed in the cracks or joints of poultry houses, or anywhere that filth is allowed to accumulate. They suck the blood and are dangerous to the health of fowls of all ages.

Treatment.—A good preparation which will destroy the mites, and also lice, is made by shaving one-half pound laundry soap into one-half gallon rainwater. Boil until the soap is dissolved, remove from the fire and stir into it, while still hot, 2 gallons of kerosene oil. This also makes a good disinfectant. When it is to be used for killing mites or lice in the houses, use one part of this mixture to 10 parts of water. When used as disinfectant add one quart of the mixture to 10 quarts of water and stir well; then add one pint of crude carbolic acid or cresol and stir again. When well mixed apply to all crevices and cracks, and spread over walls, floors, roosts and nest boxes.

The free use of kerosene is highly recommended in fighting mites. Apply to roosts, nests and all cracks and crevices. The walls may be sprayed with kerosene.

Poultry houses should be whitewashed frequently to kill disease germs as well as insects which lodge in cracks and walls. The following formula for whitewash will adhere to walls and last for a long time, either inside or outside: Half a bushel of unslaked lime slaked in warm water. Keep covered so the steam will not escape. Strain the liquid through a fine sieve. Add a peck of salt previously dissolved in water, three pounds of rice which has been ground and boiled to a thin paste. One-half pound of Spanish whitening and a pound of glue which has been melted over a slow heat, and 5 gallons of hot water. Stir well and let stand covered 5 days. Heat before ap-



Roup



Rupy eye.



Scabies.



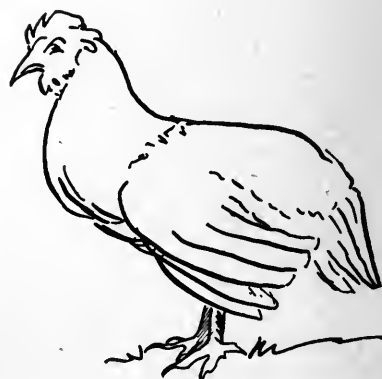
Cholera.



scaly leg.



Mite that causes
Scaly leg.



Egg bound.

plying to walls. If properly applied one pint of this mixture will cover one square yard. Coloring may be added to make any shade. It will retain its brilliancy for years. For inside of poultry houses, add 2 pints of carbolic acid for disinfectant.

Pip.

Pip is sometimes a dry condition of the tongue appearing in several diseases of the air passages, such as catarrh, bronchitis, roup and pneumonia. It is a symptom of disease, not a disease itself.

Pip, or the dry condition of the tongue, is produced by the rapid passing over the tongue of feverish breath combined with increased temperature of the body.

Symptoms.—The end of the tongue becomes hard and dry and eating becomes difficult.

Treatment.—Study the whole bird, finding out the trouble underlying this one symptom and treat the real disease.

Give soft food for a day or two, and 20 grains of Epsom salts for two mornings. Wash the mouth with water containing boric acid. Paint the tongue twice a day with glycerine or olive oil.

Rheumatism.

This is a disease affecting all parts but is more noticeable in the legs.

The causes of the ailment are exposure to cold and dampness, the feeding of too much animal matter and not enough vegetable matter. There is sometimes a hereditary tendency to this disease.

Symptoms.—The symptoms of rheumatism and leg weakness are not always distinguishable. One of the first symptoms of the former is the jerky walk and the joints become swollen. Inflammation and pain in the joints and muscles cause the bird to sit down most of the time. Trying to straighten the limbs hurts the bird.

Treatment.—The treatment also suggests the line to follow in the prevention of the disease. The birds should be housed in dry, sunny quarters and fed an abundance of green vegetables not forgetting clover mash. For internal treatment iodide of potassium is highly recommended, fifteen grains to every quart of drinking water. Use small dishes so it will all be used while fairly fresh. This is good for chicks as well as old fowls.

Rub the swollen parts with extract of witch hazel two or three times each day. Common baking soda, 1 level teaspoonful to each quart of drinking water, has given good results. Give 20 grams of Epsom salts followed the next day by fifteen grains bicarbonate of soda to each pint of drinking water.

Roup or Contagious Catarrh.

This disease in poultry closely resembles the more malignant forms of catarrh or influenza in man and is very contagious.

It is caused by a specific germ closely related to the germ that causes white

diarrhea in chicks and blackhead in turkeys. It is encouraged by keeping fowls in badly ventilated houses, keeping too many in one room and allowing the poultry house to become damp and the droppings to accumulate in the house.

Symptoms.—The symptoms at first resemble those of a severe cold attended with a feverish condition, a discharge from the nostrils and a frothy substance in the corners of the eyes. The appetite diminishes and the fowl sits with head drawn in, wings drooping and having the general appearance of depression and illness.

Treatment.—The sick fowls should be removed from the flock to a warm, dry and well ventilated room. The affected membranes should then be treated by applying antiseptic and healing mixtures. The best method is a spraying apparatus but an oil-can or even a medicine dropper can be used. A good remedy for this treatment is boric acid 1 ounce, water 1 quart, or permanganate of potash 1 dram, water 1 quart, or peroxide of hydrogen 1 ounce, water 3 ounces. Before applying these remedies it is well to wash the mouth and eyes with a solution of warm water containing 1 teaspoonful of salt to a quart. Don't forget to wash the hands well after handling sick fowls.

Preventive Treatment.—If the disease be taken in hand early, or as a preventive measure it can frequently be stamped out by using a creolin spray. Mix 1 teaspoonful of pure creolin in a gallon of water. With a small spray pump that throws a very fine mist, spray this solution about the poultry houses after the birds have gone to roost. Spray about the heads of the birds so they may inhale the vapor. It will cause a great deal of sneezing and coughing. This treatment every night for ten days or two weeks, will cure many stubborn catarrhal colds and often cures mild cases of roup.

Apply a 2% solution of carbolic acid to the affected parts.

Kerosene mixed with an equal part of olive oil has given good results.

Cleanse the nostrils and throat with equal parts of hydrogen peroxide and water several times daily and grease the nostrils with vaseline.

Make small pills of well mixed sulphur and camphorated vaseline.

A tablespoonful of clear lard, half a tablespoonful each of vinegar, cayenne pepper and mustard; mix well together and add flour until the whole has the consistency of dough; roll into slugs about the size of the top joint of the little finger and put one down the patient's throat. Repeat in twelve hours, if necessary. One dose often cures a mild attack.

Spirits of turpentine, one part, with glycerine six parts, makes a good lotion for bathing the face and eyes, for injecting into the nostrils and for swabbing the throat of roup-y fowls.

Make a 20% solution of common baking soda. Bathe the head and inject into the cleft in the roof of the mouth. Then repeat this process using peroxide of hydrogen instead of baking soda. Then inject into the cleft in the roof of the mouth and down the throat, the following prescription: Oil of thyme 1 dram, oil of eucalyptus 20 drops, oil of petrol 2 ounces.

Get some two-decimal tablets of bin-iod of mercury, and for adult fowls give two tablets night and morning. In the drinking water use permanganate of potash. Get the crystals and dissolve them in a bottle of water and then

put enough of this solution in the drinking water to make the water quite purple. Continue this latter medicine for a week and it will take the disease out of the flock. It is only the worst cases that will need the bin-iod of mercury.

Scaly Leg.

Scaly leg is caused by a parasite and is decidedly contagious. This parasite works its way in between the scales of shanks or toes. It may come from another fowl or from an infected house or brooder. The scales are irritated, pushed apart and filth begins to accumulate. This filth together with the parasite working produces a disgusting appearance of the legs.

Symptoms.—The symptoms are enlargement of the feet and legs. At first there is seen only a slight roughness but the continued irritation of the mite causes a spongy substance which raises the scales until they are nearly perpendicular. In severe cases the joints become inflamed and the birds walk with difficulty.

Treatment.—Wash and brush the legs with warm soapy water, removing all scales that come off easily. Dry the legs and apply a coating of balsam of Peru or an ointment containing two percent carbolic acid.

A remedy highly recommended is oil of caraway 1 part and 5 parts of vaseline.

When a large number of fowls are to be treated, make a mixture of one-half pint kerosene and one pint raw linseed oil in a quart can. Take this to the poultry house at night and dip both legs of each affected bird into the mixture and replace them on the roost. The feathers must not be wet as this causes the skin to blister. Repeat this in three days.

A good ointment to kill the parasite is made of one ounce of sulphur and ten tablespoonfuls of lard or vaseline. Rub this into the rough parts every other night for a week and give one application in about three weeks.

Another good method is to fill a common wooden pail nearly full of water, adding one gill of kerosene carefully so it will float on the surface. Take each fowl and dip both legs down through the oil, holding for half a minute. Repeat this in four or five days. If the shanks are feathered, care should be taken to dry the feathers as they will hold the oil, producing much discomfort by irritating the skin.

Tuberculosis.

This disease is a chronic, contagious disease. Its development is caused by germs called tubercles in various organs of the body, but more often in the liver, spleen and intestines. The germ differs somewhat from the germ which causes tuberculosis in man.

If tuberculosis exists in a neighboring flock, it may be carried by birds or animals going from one yard to another or from fowls purchased from infected flocks. The eggs of diseased birds often contain the baccilli and chickens hatched from such eggs are diseased when they leave the shell and ready to infect the poultry with which they run. Pigs, cats, rats etc., may

be infected with fowl tuberculosis from eating the bodies of birds which have died from this disease and these animals may infect other fowls.

Symptoms.—The symptoms begin with gradual loss of weight, wasting of the muscles and prominence of the bones. The comb becomes pale. The bird is weak and languid. In the latter stages, there is persistent diarrhea. Very often there is an inflammation of the joints which causes enlargement and lameness. Occasionally the skin over the joints breaks and they are found to be ulcerated. Many of the symptoms of this disease are very similar to those occurring with other diseases, thus making a diagnosis difficult. A microscopic analysis showing the presence of the bacillus is the best evidence.

Preventive Treatment.—The treatment is entirely preventive as the disease cannot be cured. All birds that are known to be infected should be killed and burned. No attempt should be made to keep any of the fowls that have been exposed to the contagion. All of the manure and scrapings of the yards should be burned. Sprinkle a 5% solution of carbolic acid over the runs and wash floors and walls, feeding troughs and drinking vessels with the same. Then whitewash the whole interior of the poultry house adding 16 ounces of crude carbolic acid to each pail of whitewash. Keep the house and yards open to sun for three weeks before putting in a new flock.

Vertigo.

This is a disease of the brain, and may be regarded as a minor apoplexy.

Symptoms.—The bird shows dizziness. The gait is uncertain and staggering.

Treatment.—The fowl can often be revived by holding the head under a stream of cold water after which keep it in a cool place and on a light diet.

White Comb (Favus).

This is a contagious disease quite disfiguring but easily controlled if treated early.

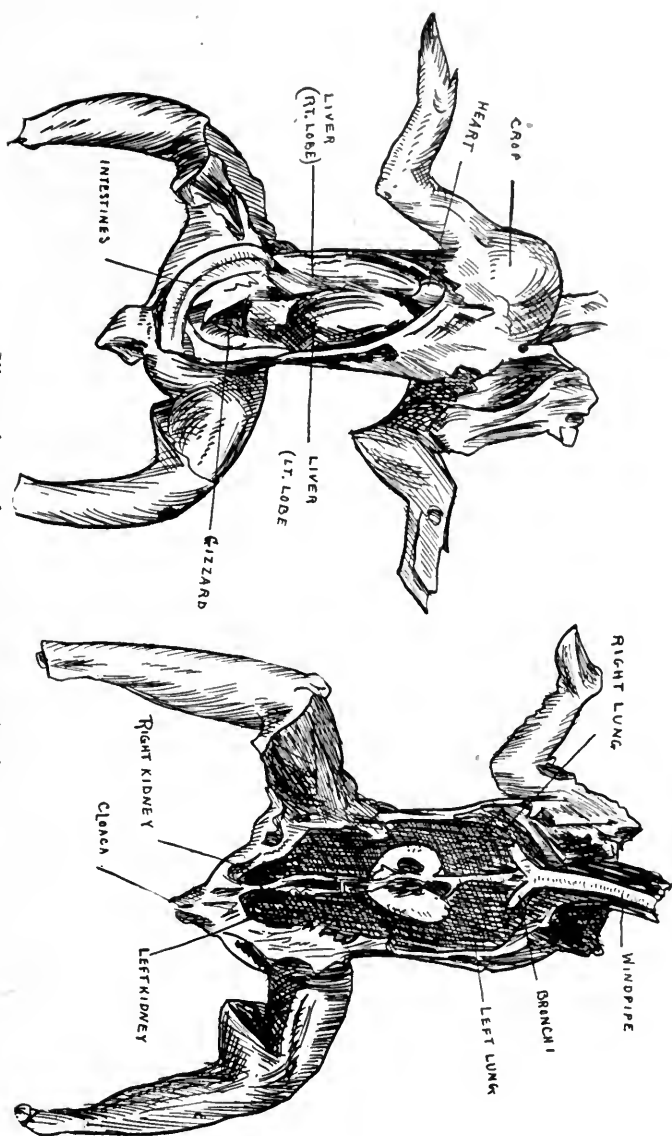
White comb is the result of close confinement, little or no air and sunshine and absence of sufficient vegetable food. The disease is transmitted from fowl to fowl by contact.

Symptoms.—Favus begins by the formation of white or grayish spots on the comb and wattles. These spots enlarge, run together and become more inflamed until the skin of the head and neck is covered and bare of feathers. As the disease advances, the skin becomes thicker until in a few weeks it may change very much the shape of the head. There will be noticed a paleness of all mucus surfaces and a weakness in all the movements of the bird.

While the disease is confined to the head, it may be cured by applying tincture of iodine to the parts.

An ointment of calomel 1 part, vaseline 8 parts, well mixed and applied daily, is an efficient remedy.

Olive oil with 1% carbolic acid is good to apply. Isolate the afflicted fowls.



Illustrations of post-mortem examination.

White Diarrhea in Chicks.

There are various causes for this ailment. A common one is wrong feeding. Either the chick is fed while too young, the food given is too heavy to digest or is fermented or spoiled. Other causes are chilling, low vitality in the breeding stock, careless feeding, too little or too much heat, impure drinking water, infected food and unsanitary surroundings.

Symptoms.—Chickens are usually attacked when 10 to 15 days old. They appear listless, their feathers become rough and they stand about with drooping wings. White diarrhea is soon noticed. The chick eats less and less, is thirsty, and shows signs of general weakness. The symptoms increase in severity and the chick is apt to be found dead.

Treatment.—The treatment is mostly preventive. If the hatching is done by the hen, the chicks should be put upon fresh ground, and any chicks which sicken should be immediately isolated or killed. By removing frequently to fresh ground or by frequent disinfection, the disease may be limited to a few chicks. If hatched in the incubator, it is well to divide the trays and brooders by light partitions so that the chicks will not be in one lot. If white diarrhea appears in any lot, such lots may be removed and the places disinfected. After four or five days, the healthy lots may be put together. In this way the greater part of the chicks are protected against a most common form of the disease. Begin feeding at from 24 to 36 hours of age and feed according to the formulas given for dry bran, rolled oats and hard boiled eggs. Give neither cracked wheat nor cracked corn until chicks are a week or 10 days old. Be sure they have an opportunity to be comfortably warm at all times.

Give small doses of castor oil.

A few drops of turpentine in a little olive oil is good for white diarrhea.

Worms.

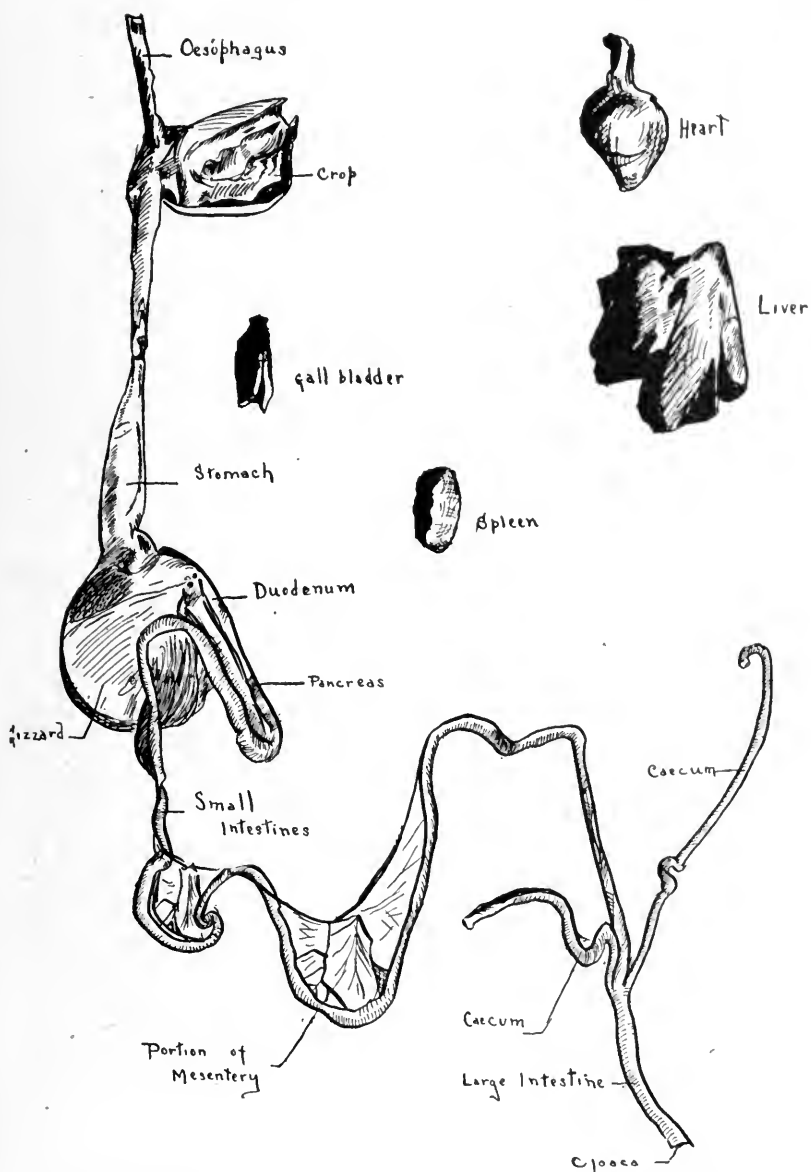
These worms are commonly parasitic on fowls.

Symptoms.—Worms are frequently present in the digestive canal of fowls, particularly young chicks. Occasionally flat tape worms are found but these are not common. Chicks infected with worms go off feed and become thin and sickly. The symptoms are really those of indigestion.

Treatment.—If you suspect worms, try to remove them. Powdered areca nut 20 to 40 grains per fowl, administered in mash or mixed with butter or lard into pills is an effective remedy.

Beat a new laid egg with one tablespoonful of oil of turpentine and mix thoroughly. Give a teaspoonful of this mixture night and morning for a few days.

Divide a quarter of an ounce of areca-nut powder into four parts and give one part every morning, follow this with a dessert spoonful of sweet oil two hours after each powder.



Internal organs of a chicken, removed (post-mortem examination).

POST-MORTEM EXAMINATIONS.

When the poultry die off from an unknown cause, post-mortem examinations should be undertaken at once. By this means, alone, can the raiser ascertain with certainty what the trouble is and remedy it. It will show him what disease he has to fight and will enable him to doctor his fowls with greater success.

It is better to pluck a bird before performing an examination and to examine him in a systematic way. However, a speedy examination may be made without plucking, by hurriedly bending back or removing the breast-bone. To handle the body easily it should be nailed, breast upward, to a board. Then the performer can easily get inside the bird by cutting along each side of the breast and bending back the breast-bone.

An examination of the afflicted organs can next be made and the disease determined by observing what the various symptoms indicate that are given below. The operator should notice whether the organs diseased are spotted, enlarged, inflamed, ruptured or gorged with blood. No single organ will give conclusive evidence unless the symptoms are very pronounced, but the appearance of all must be taken into consideration. Following are the main symptoms found in each organ and what they indicate. For names of organs see illustrations.

Organ.	Symptoms.	Indications.
Brain.....	Gorged with blood.	Apoplexy.
Liver.....	Different sized yellowish-white spots, raised and convex, that can be easily separated from the organ; often the organ itself is greatly enlarged.	Tuberculosis.
	Enlarged organ, soft and dark shade of green, many times shows whitish spots.	Cholera.
	Round patches, sunken in center associated with each caecum being clogged and sores on its lining.	Coccidial Diarrhea.
	Organ swollen and congested, can be easily torn.	Congested Liver.
	Organ overloaded with fat.	Fatty Liver.
	Organ small and hard.	Fatty Degeneration.
	Minute, chalky crystals on liver and other organs.	Gout.
	Dead parts covered with mold.	Aspergillosis.
Heart.....	Pointed hemorrhages.	Cholera.
Stomach.....	Lining inflamed and reddened.	Gastritis.
Caecum.....	Enlarged organ and sores in lining.	Coccidial Diarrhea in chickens. Blackhead in turkeys.

Organ.	Symptoms.	Apoplexy.
Intestines.....	Upper portion reddened. Contents streaked with blood.	Cholera.
	Lining inflamed.	Diarrhea.
	Presence of worms.	Worms.
Windpipe.....	Thick excretion of mucus in bronchial tubes.	Pneumonia.
	Blood from lungs in tubes.	Congestion of lungs.
	Red worms, about $\frac{3}{4}$ -inch long, clinging to trachea.	Gapes.
	Whitish mold inside.	Aspergillosis.
Lungs.....	Dark and congested with blood.	Congestion.
	Spots present (in lungs of little chicks).	Brooder Pneumonia.
	Organ is not spongy, air sacs are filled with a rather solid substance.	Pneumonia.
Spleen.....	Much enlarged.	Tuberculosis.
Mesentery.....	Blood vessels swollen with blood.	Cholera.
	Covered with little lumps.	Tuberculosis.

TURKEYS.

Opportunity for Profit.—When turkeys are properly handled, that is, when the unnatural losses are eliminated, there is a greater opportunity for profit in raising them than in any other kind of live stock. These unnatural losses are due largely to the neglect of raisers to follow the laws of nature in selecting and paring the breeding stock. Turkeys are more self supporting than any other live stock. From the time that they are six weeks old until winter sets in they will gain the greater part of their entire living from insects, bugs, grasshoppers, and waste grain that they pick up in their free wanderings over the range. In other words, when given sufficient range, they may be called self-sustaining foragers. The chance for profit in turkey raising moreover is gradually increasing due to the more general use of the flesh. Turkeys are used not only for roasting but a large number of the poults (young turkeys) are used for broilers. The flesh is also used to an increasing extent for salads, sandwiches and cold cuts. If the late hatched poults cannot be brought to maturity, they will sell for broilers at a good profit. The broiled poult is a very valuable dish in our large cities at the present time.

STANDARD WEIGHTS OF TURKEYS.

	Adult Cock (2 years old or over).	Yearling (1 year old and less than 2).	Cockerel (less than 1 year old).	Hen (1 year old or over).	Pullet (less than 1 year old).
	Pounds.	Pounds.	Pounds.	Pounds.	Pounds.
Bronze.....	36	33	25	20	16
Bourbon Red.....	30	25	20	18	12
Narragansett.....	30	25	20	18	12
White Holland.....	28	24	20	18	14
Black.....	27	22	18	18	12
Slate.....	27	22	18	18	12

The main difference in the varieties given are size and color. The Bronze and the Narragansett are the largest, the Bourbon Reds and Slate are the medium and the Black and White the smallest. A great improvement has been made in the Blacks and Whites of late years, so much so in fact that they are crowding for third position.

There is a nonstandard variety besides the above, known as the Buffs. They are quite like the Bourbon Reds and might well claim their place. The Bourbon Reds are more largely grown for the market than the Buffs.

Selection of a Breed.—The Bronze turkeys are the most popular in this country, although considerable numbers of white turkeys are bred. Scarcely any preference is shown on the open market for any particular breed of turkey, but great stress is always laid upon the quality. The best grown and best fin-

ished specimens of all varieties are always in demand. So we see it is not so much the breed that counts as it is the quality. One must only know how to take care of the birds to make a success of turkey raising.

Bronze Turkey.—This variety runs more to size than any of the others, perhaps too much so. Size within reasonable limits is desired and encouraged, but when it consists in a gain in length of thigh and shank, it is an increase of weight with but little value. The Bronze turkey is naturally the largest in size, the most vigorous in constitution, and the most profitable to grow. However, through carelessness in breeding they often lack their natural characteristics.

Narragansett.—For all purposes this variety holds its own with any of the rest, and should be more generally cultivated for market purposes. The turkeys of this variety have fine form in breast and body, shorter legs than the Bronze as well as a more contented nature. They average smaller but some declare that they can be made to mature faster and reach market size quicker than the Bronze. These birds are highly valued by those who grow them.

Slate.—These turkeys are about the size of the Blacks and Buffs as a rule. Some value them highly but they have not been bred extensively enough to determine their market value.

White.—This is another fine variety for all purposes. They grow to the most profitable sizes and dress well for market. With them, as with other white poultry, the pin feathers do not show as much as in the darker varieties, and their pinkish white shanks add to their appearance. White turkeys are largely grown in some localities. They are no harder to rear and have as much vitality as the other varieties. Also the Whites are more contented to stay at home than some of the others, so they are suited to farms with limited range.

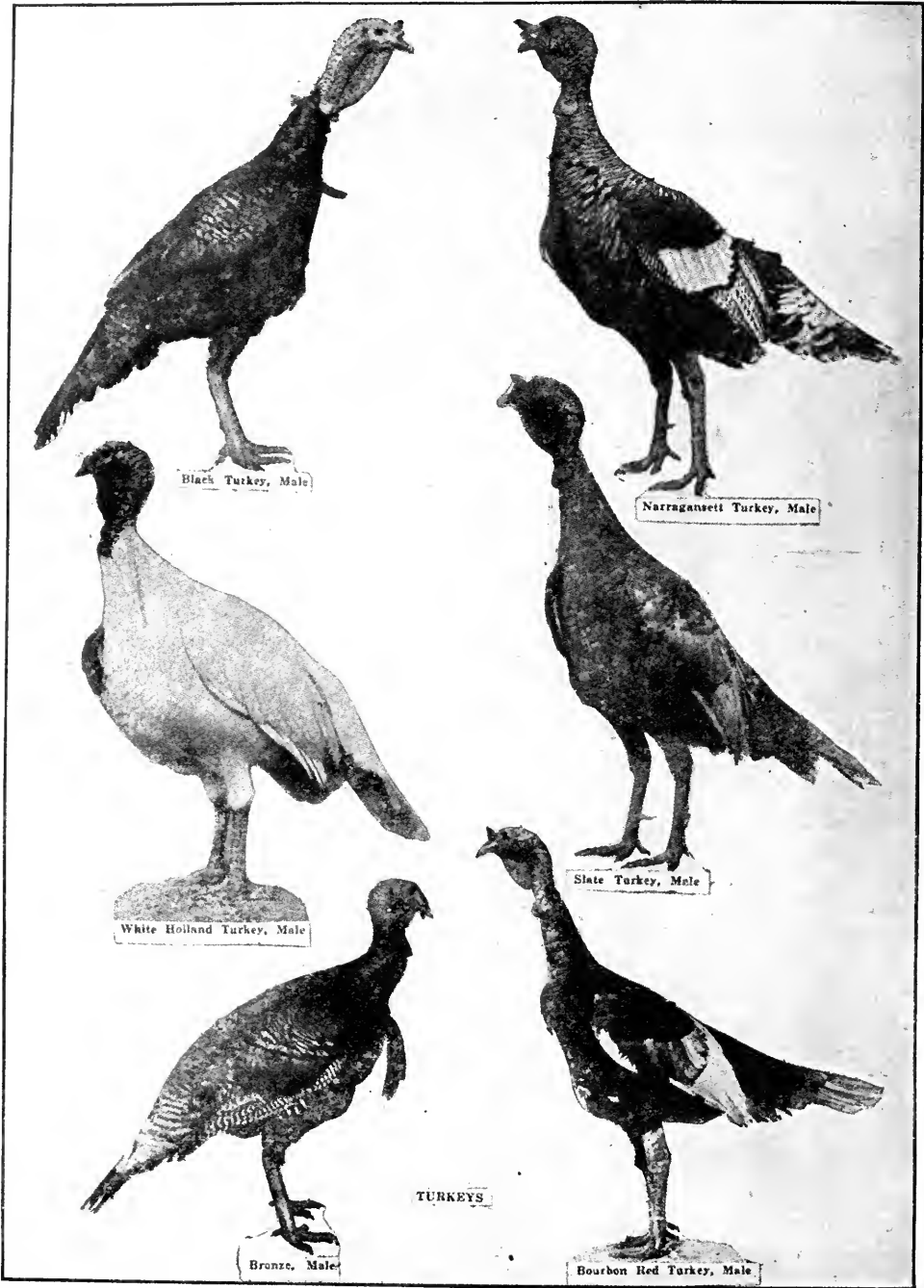
Black.—These turkeys are fine for table purposes. When dressed they present a most desirable plumpness and finish. The Blacks are quite hardy. They round up nicely at an early age and mature for the early markets. Like the Whites, the Blacks are quite contented at home which makes them a desirable bird for the farmer who wishes to keep them on a limited area.

Bourbon Red.—This is a good, all around variety and some think the rich color of flesh and skin excels the others. The birds grow large, vigorous and strong with a splendid fullness of breast.

Buff.—This variety is scarce. They are very attractive when dressed and grow quickly. The average weight of the birds is several pounds less than that of the Narragansetts. Some growers in the East are paying more attention to this variety in order to determine their value.

HOUSING.

As a rule little housing is done for turkeys except in very cold climates. They need the open air. However it is always advisable to give them some kind of shelter to protect them from the direct blast of the cold wintry winds. Where shelter is necessary a coop may be built patterned after poultry houses with the slanting roofs. An open ventilator should be built in front, close to the roof, and this should never be closed, except in cold weather. Just enough light is



necessary to show the turkeys the way to and from the roosts. The roosts are built on a level in the front of the house, with a rolling or sliding door in the rear. Turkeys should not be confined so the door should be left open all day that they may come and go as they wish. In cold, snowy weather they may be fed in the house.

Good House for Cold Climates.—A good house for the cold climate of Canada is the double inclosed apartment house. This is used for breeding stock in winter. Connected with the house is an inclosed run to protect the birds from the cold and at the same time furnish opportunity for fresh air exercise during the day. It will keep the turkeys from being carried away by all kinds of midnight marauders. Such a house is easy to build and inexpensive.

Coop for Poult.—The following makes a splendid roosting coop for poults in mild climates. It keeps out incursions of night animals. The frame should be 6 ft. long, 4 ft. wide, 5 ft. high in front and 4 ft. high in rear, back and roof boarded, ends and sides enclosed with small mesh poultry netting. Put in low perches and keep brood until they are ready to fly up out of danger. Move this coop to fresh ground frequently, thus keeping the ground pure.

Do Not House With Chickens.—Turkeys will not do well if housed with chickens. They easily become infested with lice from them and lice are sure death to young poults.

BREEDING.

(Including Valuable Information on the Care of Breeding Stock and Hatching.)

Selection of Breeding Stock.—"Like Begets Like" is a good rule to follow in breeding turkeys. The careless selection, or no selection at all, of breeding stock has given no end of trouble to turkey raisers. In many localities all of the turkeys raised have descended from the same original pair, no new blood having come into the neighborhood. Such a foolish procedure means the destruction of the constitutional vigor of the birds and failure is sure to follow. A wise farmer always selects the best corn or grain he has for seed; he should exercise as much care in the selection of his breeding stock in turkeys. In fact if a person wishes to succeed in this profitable industry, he must give much care to the breeding of his birds.

Kinds of Hens to Select.—The hens to be used for breeding should be strong, healthy and well matured. They should be of medium size, well formed, strong boned, and possess constitutional vigor. Exceedingly large hens as well as very small ones are seldom the best of breeders. Vigor and stamina are absolutely necessary. The best producers are turkey hens in their 2nd or 3rd year of laying. The best young hens should be kept with this in mind.

Kind of Males to Select.—It is of first importance to have a first class male serve as breeder. This can easily be seen when we say that the male is one-half of the entire flock in the matter of breeding. None can be too good. The male should be of long body; he should have a full, round breast and plenty of bone and should not be oversized.

The male should be of some standard variety, no matter whether the hens

are or not, for he will carry with him the influence of his breeding. If the hens are of a standard breed, the male should be of the same breed so as to keep the stock in its purity. Much better results are obtained by selecting individuals of some one of the standard varieties than by cross-breeding. Where turkeys are cross-bred, it tends to bring the weak points of both sides of the cross to the surface. Proper crosses sometimes improve the first issue but are seldom successful when followed up.

It should be remembered that the female influences the size of the offspring. Fair sized females of good health, constitutional vigor and mature age with a medium-sized male will do far better than small females with an exceedingly large male. Pairing small weakly females with large males is poor policy.

In-breeding.—Turkey hens will wander miles if necessary to pair with a male and this is one of the chief sources of in-breeding. In localities where few turkeys are raised, one male is often depended upon to serve for all the females. This too often forces him to pair with his own descendants, and causes a lack of vitality in the offspring. Turkeys suffer from in-breeding more than any other of our domestic fowls.

PRACTICAL SUGGESTIONS FOR SELECTING BREEDING STOCK.

1. **Turkeys Demand New Blood.**—Do not in-breed. It is better to send away for a new male than to risk close breeding. Turkeys must have new blood if they maintain their constitutional vigor.

2. **Secure Tom in Fall.**—The male should be secured in the fall that one may be sure of his vigor and health in general before the breeding season.

3. **Kind of Tom to Use.**—Do not think that a large overgrown male is as good for this purpose as a well-proportioned, medium sized one that is full of health, strength and constitutional vigor; one that has a broad masculine head, heavy ear carunculations and wattles, long stout shanks, large feet, and up-right carriage, as these indicate health and vigor.

4. **Age of Hens.**—The turkey hens used as breeders should always be over one year old. If she continues to lay she will be useful until about eight years of age.

5. **Kinds of Hens to Breed.**—Use medium-sized hens. Avoid the smaller ones and those unnaturally large. Use only those that are healthy, strong and vigorous. Size, with large feet and legs, broad heads, and good length of body and constitutional vigor are influenced largely by the female; color and finish by the male.

6. **Indication of Value.**—Value is indicated most clearly by a full-rounded breast and body.

7. **Length of Thigh and Shank vs. Size.**—Do not mistake length of thigh and shank, if out of proportion, for size.

8. **Profitable Market Characteristics.**—The most profitable market characteristics are constitutional vigor, compactness of form, and length of breast and body. Select birds having these characteristics for breeding purposes.

Number of Females to Male.—In farm flocks that are running free on the

range, it is best to have not more than six females to one male. When the turkeys are yarded in flocks of eight to twelve, it is better to use two males. When this is done allow only one male with the hens at a time. Change the males at least twice a week.

Care of Breeding Stock.

Range.—The flock should have free range or a large inclosure after they have been mated. Without plenty of range, turkey raising is seldom satisfactory or profitable. Turkeys are by nature wild birds and wild or semi-wild habits are necessary to their best welfare. Some flocks have done well on 8 to 20 acres but only a few can be grown at a time in this way, and they require close attention and excellent care. A wide range of territory for them to go over undisturbed is of vital importance. If allowed free range they will pick up the kind of foods suitable to their needs and liking, besides getting plenty of needed exercise.

Roosting Places.—Turkeys do the best when allowed to roost in the open. They enjoy roosting in the trees or upon poles hung in the lee of some building. A good roosting place can be made by planting posts that project about 7 feet above the ground and placing upon these long poles about 2 inches in diameter. Turkeys will roost the year around in such places and fare exceedingly well unless, of course, the weather should be extremely severe. If housed at all their quarters should be roomy, perfectly clean and well ventilated, and they should be permitted to come and go at will during the day. Any house will do, that will protect them from marauders of every kind and from the weather.

Condition of Stock and Feeding.—The breeding stock should never be allowed to become too fat. A turkey that is once fat seldom, if ever, regains its former vigor. Access to granaries and barns often produce an overfat condition. If they have a tendency to become overfat feed them boiled oats. Some corn and wheat may also be fed to advantage. Although we say they should not be allowed to become fat, we do not mean they can go without feed entirely. Do not make them go underfed. If the birds have access to the whole farm there is slight danger of their going hungry, especially if any stock is fed on the place. When they are unable to find feed it should be supplied them. When oats, barley, corn or wheat are fed it should be scattered on the ground so that they will have to pick up the grains, kernel by kernel. Avoid feeding much corn as it tends to produce too much fat resulting in infertile eggs. The breeding stock need vegetable food, grit, charcoal and some meat food. They will eat lots of charcoal and it is fine to keep them in condition.

The Tom should be well fed. He is generally underfed when fed with the flock. It is well to give him an extra ration of corn every day.

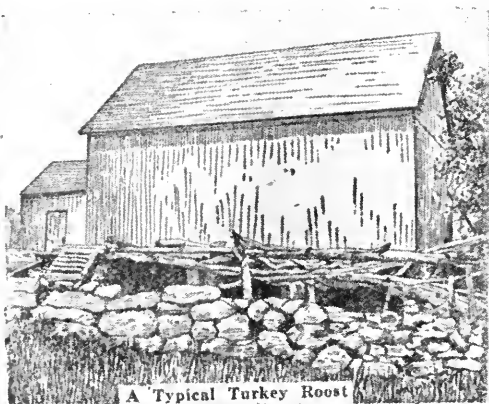
Laying.—A properly managed hen turkey generally means one that is allowed to run her own affairs. Such a bird begins laying from the middle of March to the first of April depending upon the latitude and the season. She will lay about 3 clutches in a season, about 30 eggs in all, if a good layer. When she becomes broody she can be broken up by simply destroying her nest and



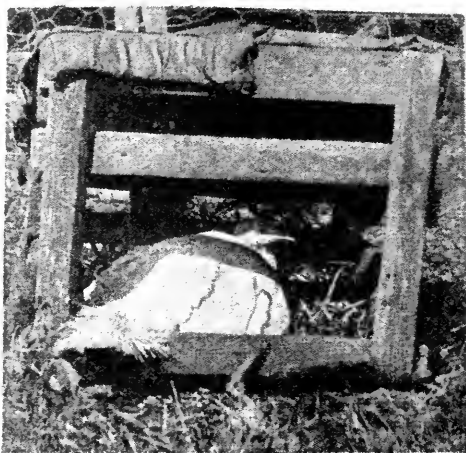
Protection For a Turkey Nest



Paddle Used to Prevent Turkey Hens From Flying Over Fence



A Typical Turkey Roost



Coop Used For Turkey Hen While Sitting



Packed Ready for Shipment

TURKEYS

putting her to laying again. Those who only have a few hens and wish to raise a great many poults should keep the turkey hen laying and rear the poults with domestic hens.

Pairing.—It is best not to allow more than one male turkey at a time to run with a flock of breeding hens as extra males only disturb each other when pairing. The pairing with the male should be complete. If it is not, the whole clutch of eggs will be infertile. Immediately upon pairing with the male the hen sets out to find a nest in which to lay her eggs. If the eggs are infertile her work is all for nothing. This shows the importance of having the male full of vigor at pairing time.

Care of Eggs.—One should watch the hen-turkey very closely to see when she lays her eggs. The eggs should be gathered regularly and carefully. They should be kept in a cool place and turned daily. If the eggs are left out in changeable weather they may lose their vitality. When the eggs are taken from the nest, eggs of some other kind, preferably large-sized china eggs, should be placed under the hen to keep her from becoming dissatisfied and changing her nesting place.

Turkey Nests.

If a turkey-hen is not watched she will naturally find a nest in the most out-of-the-way place she can find, such as under a pile of logs or wood, or in a heap of brush. Here she will lay her eggs and in case they are neither chilled nor carried away by wild animals, she will hatch them into vigorous poults herself. She will then take them into the fields as far away from the accustomed paths of man as possible and here she will feed and rear her brood after her own inclination. When autumn comes she will come forth with a flock of large, vigorous, young turkeys. They will be robust in development, vigorous in health, and bright in plumage. Some of the largest turkey raisers in the country desire their hens to seek their nests and rear their young in the above fashion. This is the ideal way where there is plenty of range and the farm is so situated that the hens can be given their freedom without danger to the eggs and brood. On small range the hiding of nests should be carefully guarded against.

To Prevent Wandering.—Watch the hen closely to determine her nesting place. If she selects a place that is not protected, it is well to provide a coop or box, with an opening for her to go in and out, to protect her eggs from the weather during the four weeks of incubation in case she is going to hatch them herself. Just before time for the eggs to hatch a slat frame can be placed over the hen to keep her from wandering off with the newly hatched poults. Instead of the frame it might be all right to simply nail a couple of slats across the opening of her coop. This plan will increase the size of flocks as the young poults can be watched and given better care.

Preparing Nests.—Nests should be secreted in the places that the hens would be most likely to pick for themselves—such as thick brush or a secluded fence corner. The places are easy to locate after the first season because hen turkeys almost invariably select a place to lay near their previous season's nest. An empty barrel is a fine thing to use for the purpose. Holes should be made in

the lower side to let out water which might accumulate. The barrel is placed on its side and the nest within made of clean straw or hay. If the hen avoids her nest, she should be fed close in front of it. If she still refuses to use it, it may be necessary to enclose her until she is content to lay where requested.

To Prevent Hiding of Nests.—If the grower wishes to keep the hens from hiding their nests and to save all the eggs laid, it may be necessary to confine them. By doing this he can teach them to lay and sit in his prepared nests. If the hens are confined they should be let out each day after they have laid until roosting time when they can be put back into the inclosure. Turkey hens will lay about twenty eggs before becoming broody and then if broken up will lay again. They can be set on their second clutch of eggs, if the eggs are to be hatched out by the hen turkey herself. They are usually hatched under domestic hens.

Keep Nests Separated.—In a large flock of turkeys it is often the case that two or more hens will try to nest close to each other or even together. If this is allowed, trouble is certain to follow unless they become broody at the same time and this seldom happens. Two hens sitting on the same nest will get along fairly well until about the fourth week when they will begin fussing for possession of the eggs. This generally results in the destruction of most of them.

Keeping Record of Nests.—Keeping a record of each nest is very essential. A record is easily kept and is useful for reference. It should show when the hen began to lay, the number of eggs laid, when she became broody, when the eggs hatched, etc.

Hatching.

Hatching by Turkey Hens.—Turkey hens are rather good mothers. They produce such a limited number of eggs it is seldom necessary to hatch them in an incubator. Turkey hens are practically a necessity for the successful rearing of poults so they should be permitted to hatch out a few of their eggs at least. This will induce them to brood the poults.

Hatching by Domestic Hens.—If a breeder has only a few turkey hens and wishes to hatch out a large number of poults, he should keep the turkey hens laying and hatch her eggs under large domestic hens. When the turkey hen has laid from fifteen to twenty-three eggs she will want to sit but she can be easily broken up by shutting her in for a few days. After she is given her liberty she will soon begin laying again. The turkey hen can be allowed to sit on some of her second clutch of eggs; in this way many more poults can be hatched than by allowing the turkey hen to sit on her first clutch.

Hatching with Incubators.—Turkey eggs can be hatched in incubators about as well as any others but we believe that the hens themselves will produce the biggest hatch. They will hatch out more of the weak germed eggs. Unless an exceedingly large number of poults are to be hatched the other methods will probably be the most profitable. It is the prevailing custom to hatch turkey eggs under hens, as most people have more confidence in that method.

Time Required for Incubation.—The period of incubation for turkey eggs is about four weeks,—27 to 29 days. The eggs that are fresh when they are put under the hen will hatch before those that have been kept for some time.

Number of Eggs for a Sitting.—If the pairing of the hen with the tom is complete and the tom is in good condition, practically every egg laid by the hen will be fertile. Many times each egg in the nest will produce a living poult. No more eggs should be put under a hen than she can properly cover. Domestic hens of course cannot cover nearly as many as the turkey hens. It is much better to put too few under a hen than too many. If too many eggs are given for a sitting, a poor hatch is almost certain.

Two Broods in One Season.—It is natural for a turkey hen, when not allowed to sit on her first clutch, to lay a second clutch of eggs. She may find another nesting place to do this. The first clutch of eggs can be gathered, given proper care, and set. Thus by preventing the hen from sitting on her first clutch, a second may be raised in one season.

Rules for Care of Setters.

1. **Dusting Hens.**—Dust the hen with insect powder at least twice while setting. Never use kerosene for this. Lice are sure death to young poults.

2. **Dust Bath.**—Provide a dust bath near her nest. This can be done by working up a few feet of ground in a sunny location. If the soil is not fit it will be easy to carry a bushel of dry loam to the place. It is a good plan to throw some lice-killing powder into the dusting place. This will aid in keeping the hen free from lice.

3. **Fasten Hen on Nest at Hatching Time.**—Fasten the hen on her nest after she has sat about 26 days to prevent her leaving it before all the poults are strong enough. If the hen can not be fastened on her nest, she can often be prevented from leaving by throwing corn within her reach.

4. **Food and Water.**—Supply the hens with food and good, clean water. Have these close at hand. Corn and wheat are the best feeds for them at this time.

5. **Grit and Charcoal.**—Give them plenty of grit and charcoal.

Brooding Natural.—If given a little more attention a domestic hen will successfully bring up a brood of young poults until they begin to wander, then she cannot keep them together. At this time they should be given to a turkey hen. The poults will usually leave their foster mother in time anyway, to go with a brood headed by a turkey hen. Many times the poults are given to a turkey hen as soon as they are hatched. Turkey hens are generally pretty good mothers. Those that have reared a brood or two will generally care for the poults better than hens that have never reared a brood. The little poults must be taught how to eat and old hens usually give more care and attention to doing this. Domestic hens are often better, for this purpose, than turkey hens because they give the matter special attention and teach the poults how to eat when very young.

Artificial.—The artificial brooding of poults has been tried in some places. Any person that can successfully brood chickens this way can brood turkeys. Some breeders think it is safer to brood a large number of poults artificially than to trust them to turkey hens. The chief difficulty to overcome in artificial

brooding is teaching the poults to eat. They will run about the brooder with their heads up, never thinking to look down to the floor for their food, until they die from hunger and exhaustion.

Teaching Poults to Eat.—To induce poults to eat take the food between the fingers and hold it close to their bills until they take it. They will have to be fed this way many times a day for several days before they will learn to eat of their own accord and to look on the floor for their food.

RAISING POULTS.

(Valuable Information is Given in This Department on the Feeding and Care of Poults.)

Caring for the poults is the most difficult part of turkey raising and requires the utmost care. One must study and then practice the things he learns, to know what to do and just when to do it. Practice makes perfect in this line as well as in others. A person must learn to use his own head to make a success at turkey raising. He should study the experiences of other breeders and learn to profit by their successes or failures. But above all he should study his own conditions. One year's actual experience in raising poults will teach him more than all he can learn from others.

How to Handle.

No arbitrary rules can be set down for handling poults. One person will care for them one way and another will use opposite methods with equal results. Some persons give lots of freedom, others hold them in check. There are about as many different methods of feeding as there are neighborhoods where turkeys are fed.

Care of Mother and Brood.—Where the simple method of permitting the turkey hen to take care of herself and brood as her nature and inclination directs, can be followed, very little care is necessary. About all that can be done is to hunt the flock up once a day to see that they have sufficient food. If it is yet too early for them to get bugs and worms and if the grass is not green it will be necessary to feed the hen some whole corn and the poults some prepared dry grain feed. Such extra feeding, once a day, will hasten the growth of the poults even when the season is far enough advanced for them to pick up their feed.

Coops.—If the flock is to be confined, a lath or slat coop should be placed over the hen just before the eggs are hatched. This will keep her from leaving the nest too soon and also prevent her from wandering off with her young. The coop should be large enough for her to stand erect and move around. The roof may be covered with tar paper to protect the brood from the sun and rain. The floor must be clean and dry for the poults. It may be of earth or boards. However, earth is best because a natural environment tends to increase the health and vigor of the flock and helps to keep up their spirits.

Have Coop Sufficiently Large.—Be sure the coop is large enough. It should be at least from 3 to 4 feet square. Many times the restless condition

of the mother hen is caused by too small a coop. She becomes irritated, tramps about and kills her young just because the coop is undersized. Do not try to use a chicken coop for this purpose. The slat coop will do for the first day or so.

Requirements for Coop.—Any coop or house that will protect them from rain and storms and is large enough will do for the hen and poults after they are taken from the slat coop. Care should be taken to have it ventilated and not too warm and damp. It should be light, clean, and entirely free from parasites. These are the essential requisites of the building which is to house them the first week or so.

Dampness Injures Poults.—The poults should be given free range part of every day if possible, but they should be made to stay in nights and on wet days; even the morning dew will injure young poults as they cannot stand the wet.

Old Coops.—Old coops should never be used unless they have been given a thorough cleaning on all sides. A week before the coop is needed it should be painted with crude petroleum in which some naphthalene balls have been dissolved. Fill every crack and crevice with this and be sure that all odor from the preparation has disappeared before it is used, because it is harmful to the young poults.

Runs.—Early in the spring (which means until about the last of May in the Northern states, for there are generally some cold windy days up to that time) it is a good plan to provide a runway in front of the coop. This can be made from boards a foot to a foot and one-half high and about sixteen feet long. Three of these boards will make a triangular shaped pen which will protect the little poults from the winds when they run from the coop. The sun will shine into the run and make it warm and comfortable. The poults will thrive better if they are not exposed too much to cold winds. The enclosure should be located on high ground, that is well drained, so the poults will have no water to venture into, to get wet or drowned.

Sun's Rays.—While the poults are young they must never be allowed where they will get the direct rays of the sun, or it may wilt them completely. Many times when they are exposed to the direct rays of the sun they will reel as though suffering from sun-stroke and become very weak. They will then move about slowly, dragging one foot after the other, and give forth a feeble peep, which means they are near their end.

It is a good plan to make a large run, as described above, in which to place the hen and brood. The hen can step over the sides and leave the enclosure when she so desires but the poults cannot. She will not go far away from the poults. Many times, if given entire freedom with her brood, the hen will take them into the brush or into the fields, and it will be impossible to get them into the coop again.

When the poults are stout and sturdy, the hen can be set at liberty so as to teach them how to pick their own living off the range. The poults will be old enough at 6 or 8 weeks.

Feeding.

Various Methods.—After thoroughly investigating the many methods used in feeding young poults, we find to what degree the general rules already given are followed. All who succeed use practically the same methods. The chief differences are as follows: first, soak some bread in milk and squeeze it dry before feeding, giving it to the poults as soon as they will eat, while others feed bread and milk in a saucer; second, some give a diet entirely of grain, while others feed practically everything they think the poults will eat.

Follow Nature in Feeding.—Too much stress cannot be laid upon the dangers from feeding unnatural food. Food that is too rich produces bowel trouble and other complications. No feed of any kind should be given before the poults are from 36 to 48 hours old.

Feeds Used at First.

1. **Cracked Corn and Wheat, Oatmeal, Grit and Scraps.**—Finely cracked corn or wheat or fine oatmeal, together with a little fine grit and a very little granulated meat scrap. Feed the first few days.

2. **Bread Soaked in Milk.**—Stale bread soaked in sweet milk. Press out the milk as much as possible. Poults are not slop eaters. Feed every hour or two for 2 or 3 days, then add a little hard boiled egg, shell and all broken fine. Caution: Never use sour milk and do not feed bread soaked in this way after it has soured.

3. **Chick Foods.**—A diet of one of the dry grain chick foods is good for poults the first two weeks.

4. **Rolled Oats, Hard Boiled Eggs and Lettuce.**—Rolled oats, hard boiled eggs and lettuce, all chopped fine, make a good food for the first week. This is given to chicks being raised in brooders.

5. **Clabbered Milk and Onion Tops.**—Make a curd by scalding clabbered milk. Squeeze as dry as possible before feeding. Mix this with finely chopped onion tops and add a little black pepper.

6. **Hard Boiled Eggs and Stale Bread.**—Mix hard boiled eggs and stale bread into a crumbly mass. Many feed this with good results.

7. **Bread, Milk, Onion Tops and Eggs.**—Soak stale bread in milk and squeeze dry. To this add hard boiled eggs and onions, chopped fine. As the appetite increases, stale bread, corn meal, onion tops, rolled oats, oat meal, middlings, etc., may be added to the ration.

8. **Wheat, Oatmeal and Cracked Corn.**—A mixture of broken wheat, oatmeal, and finely cracked corn is fed by one of the most successful breeders in the country.

Grit.—Grit should be kept before the poults from the first. The poults cannot grind their food without it. Coarse sand is fine for this purpose, and it will supply all the grit that is needed if kept constantly on hand.

Water.—Give the poults plenty of good clean water. Keep it before them at all times and keep the water dishes scalded out.

Charcoal.—Charcoal is another fine thing for the poults, as it is a safe-

guard against fermentation in the gizzard or crop and thus aids digestion. Charcoal helps to keep the poults in good health. If given at first it should be finely ground.

Green Feed.—If the poults are not at large, they should have a supply of fresh green feed given them. If a run is used, it should be moved to a fresh spot every day.

Dried Blood.—A little dried blood is very good to mix with the feed of the poults as it takes the place of worms. Too much, however, will loosen the bowels.

Meat.—After the first couple of days it is well to add a little finely cut meat to the ration. Care should be taken that the meat is pure and sweet. Infected or tainted meat will injure the bowels of the young poults in a few hours and cause great trouble. Cooked meat is better for them than green meat. If any green meat is fed, have it finely cut and feed very little at first. Well cooked, lean beef, cut into fine pieces is very good for this purpose.

When to Feed Little Poults.—One should begin giving little poults food quite early in the morning and should feed them at frequent intervals during the day—probably from 4 to 6 times a day, the first couple of weeks.

Amount to Feed.—Give them only what they will eat willingly and no more. Be sure they have sufficient food to supply their wants but avoid overfeeding them. Overfeeding is dangerous. It has a tendency to congest and clog the bowels. Many poults are killed by overfeeding. Even too much milk curd or hard boiled egg is injurious.

Hand Feeding Important.—It must be remembered in raising poults that turkey hens are not as attentive to their offspring as domestic hens. They will not spend as much time in teaching them to eat. For this reason hand feeding is important, in fact, too much stress can hardly be laid upon it. A great deal of benefit might result if more attention were paid to practicing it. To feed by hand successfully one must take the food between the thumb and fingers, hold it to the beak of the young poult, and induce it to eat. This requires patience but it will often return benefits far in excess to the effort and time expended.

Overdoing.—The best results can never be obtained by handling turkeys like hothouse plants or cage birds. Such handling does not agree with their semi-wild nature. It is natural for turkeys to wander over the range and pick up their feed at leisure, getting plenty of exercise as they eat. In their present semi-domestic condition, they require care and attention but this should not be overdone. One must use common sense in tending them. Do not feed turkeys on unnatural foods nor overfeed them at any time. Give them plenty of fresh air and outdoor exercise. Treat them like turkeys.

Neglect.—The mistake is often made of giving poults too much care when young and then neglecting them as they grow older, perhaps at just the time they need the most attention. One enjoys caring for the "cute little poults". but the novelty wears off to their disadvantage as they grow older.

Times for Special Care.—There are two times when poults need special care. The first is when they are growing their feathers and the heat easily

overcomes them. The second is in the fall when the frost destroys their natural foods on the range. Many poults are lost at these critical times every year. Care should be taken to see that they have plenty to eat at these times. While they are growing their feathers they should not be allowed in the direct rays of the sun.

Feeds For Older Poults.

1. **Corn, Wheat and Oats.**—As the poults grow older a mixture of coarsely cracked corn, whole wheat and hulled oats are excellent. Still later whole grains of corn should be given.

2. **Hulled Oats.**—A more nutritious grain for growing poults is not known than hulled oats. This can be fed even before corn or wheat is given. Oats should be hulled to avoid the injurious effects caused by the pricking and irritating portions of the hull. Plump, heavy oats that are mostly kernel should be selected for this purpose.

3. **Oatmeal, Wheat, Corn, Meat Scrap.**—A good ration to feed at this time is oatmeal and finely cracked corn or wheat. To this add a little finely cut meat. Have the meat pure and sweet.

As the poults grow older, the size of the grains can be increased until the whole grains are being fed. They will learn to forage more each day and the more they pick up for themselves the less food will have to be given them. However, the breeders who have the best success are those who feed their turkeys at least once a day, regardless of their age or the condition of the range. The poults should always have access to good clean water. When on the range they will pick up enough grit; however, it is always well to keep them supplied with charcoal.

Feed Wandering Flocks Once a Day.—If the poults have been confined they can be given their liberty when about two weeks old. They should be watched and fed once or twice a day. It is a good plan to get them in the habit of coming to the barn every night for food. If they miss coming of their own accord just once, they should be brought up or they will not come again. Feeding them at least once a day helps to keep them tame and makes them mature earlier.

Feeding in Wet Weather.—A continued wet spell soon deprives the poults of the bugs and worms they are used to feeding upon and also keeps them from getting enough other food. They should be fed at least twice a day under such conditions.

Avoid Poor Grain.—It does not pay in the long run to use shriveled, musty or poor grain of any description. To do so is but a loss of time and money for the results are certain to be disappointing. The greatest financial rewards are gained by those who keep the best stock and give them the best food and care. Good sound grain is the best at all times for feeding the growing poults.

Stock Turkeys.—A great many breeders make the great mistake of selling off their very best, most thrifty birds and keeping the least matured for breeding stock. They feed the birds altogether instead of separating their breeding

stock from those intended for market. This practice soon undermines the vitality of the flock. The very best should be kept for producing stock and the others sent to market. Do not keep fowls for breeders that are poor and thin in flesh.

Condition for Egg Production.—To secure the best results in egg production hens should neither be too lean nor too fat. They should be kept in good condition out of laying season and during it. When out of laying season they should have food enough to maintain their physical condition and during it they must have the food suitable for egg production. Too much fat in the body comes from feeding an excess of fat producing material while the hen is not laying. While laying a hen seldom becomes overfat.

Feeds.

1. **Boiled Oats, Wheat, Corn.**—An excellent feed for stock turkeys is boiled oats, drained of all moisture, a little corn, and some wheat. This ration is one of the best known to make turkey hens lay. It can be successfully fed if the hens are kept in condition before the laying season.

Feeding For Market.

Fall Feeding.—At this time of the year the turkeys must be sure to be fed. The cold weather and frosts make the natural food scarce and it must be supplied them. Many turkeys die at this time of the year from neglect. Feed must be given to begin their preparation for market. If it is not given them they will lose fat and flesh in hunting for it. A mixture of corn and wheat is the best for this purpose. Just a little should be fed at first, and the supply gradually increased until they are fed all they will eat. Feed them three times a day at the same place and they will soon form the habit of coming to that place for their food. When their longing for food is satisfied, they will cease taking such violent exercise and put on flesh.

Fattening.

Confinement.—The most successful turkey raisers in this country never confine their fowls to fatten them, but allow them free range and feed them all the wholesome fattening grain they will eat.

Feeding.—The main thing is to keep the turkeys growing from start to finish and have them ready for market by Thanksgiving. Prices are generally higher at Thanksgiving than the holidays. To do this the birds should be well fed when cold weather sets in and should be in robust condition. When the turkeys are used to grain feeding as given above, they should be given one of the following feeds:

Feeds.

1. **Corn.**—Give them all they will eat of sound old corn. If new corn is fed in large quantities it often gives turkeys diarrhea and keeps them from

putting on weight. If new corn must be fed it should be introduced gradually into the ration.

2. **Corn, Wheat, Oats, Corn Meal, Milk.**—Feed a grain mixture of corn and wheat, and a mash of corn meal and ground oats mixed with milk. Give the grain feed morning and night; the mash at noon. If more convenient the mash may be fed twice between morning and evening—about 10 o'clock and 2 o'clock. Feed all they will eat up clean with a relish each time.

3. **Chestnuts and Celery Seed.**—If one is near a market where he can get an extra big price, it may pay him to feed the fowls chestnuts and celery seed during the last few weeks of fattening. Feeding these gives the flesh a splendid flavor and quality. They are rather expensive, however, and it will not pay to feed them unless a much higher price can be obtained for them on the market.

Grit and Water.—See that a fresh supply of grit is before the fowls at all times and plenty of good clean water.

Marketing.

It requires quite as much care to kill and prepare turkeys for market as it does to raise them. If the proper time and attention cannot be given to the killing, dressing and packing for market, the birds should be sold alive. A great deal depends upon the proper marketing, so much so in fact that small growers should either dress and sell to their home market or sell to some person making a business of handling such stock. Carelessly dressed stock never commands the highest quotations, no matter how well fattened it is. Stock with bruised or torn skin or scalded stock is not wanted, except at low prices. For instance, if a box of a dozen turkeys contained just 2 or 3 damaged birds, the whole 12 would be sold at a lower figure than they would otherwise bring. Dress the birds well or sell them alive.

Killing.—It is hard enough to kill turkeys at best, so the most humane methods should be used. No food should be given the birds for 24 hours before killing them. This permits the entrails and crop to become emptied and lessens the danger of spoiling.

Methods Used.

1. **Stunning and Sticking.**—The most common method of killing and we believe the most humane method, is as follows: Suspend a cord or wire from a beam or some object above the head so that the lower end comes about even with the shoulder; hang the bird to this by his shanks—head downward; hit a sharp blow on the back of the head to remove all sense of pain; reach the knife through the mouth and cut crosswise to sever the arteries in the throat and allow the bird to bleed. The head can be held downward by a weight with a short cord and a hook to fasten in the beak or nostrils. When the blow is delivered properly, the muscles of the bird will relax immediately and the feathers can be removed.

Breaking Neck with Backward Jerk.—Another plan is to break the neck

with a quick jerk or twist backward. After the neck is disjointed the head is pulled away, so that it will form an open place in which the blood may settle. It is claimed by some that the birds will keep longer when killed this way than when killed by the other methods, as there is no opening to admit the air into the body. This method requires a little practice to do it well.

Beheading.—A third way is the old method of beheading with an ax, which has been used for so many years. This plan is not as good as the other two when the birds are sent away from the home market because large markets demand that the heads be left on.

Dressing.

Dry-picking.—If the birds are to be dry picked, begin plucking out the feathers immediately after sticking them before the blood stops flowing. Be careful not to tear the flesh. Pull the wing feathers and the main tail feathers first by yanking them straight out. Some markets demand that the main feathers of the tail and the primaries of the wings be left on the carcass, and if that is the case they should not be removed. Remove the breast feathers next because the skin of the breast is tender and likely to tear if cold. Jerk them straight outward from the bird as it hangs, a few at a time. After plucking the breast move up over the body and then to the back. Finish on the neck. A few neck feathers are usually left on. Do not remove the entrails, head or feet. Be sure the whole carcass is absolutely clean. Wash out the mouth to remove the blood.

Scalding.—Everyone knows this method. However, let me urge the performer to guard against tearing or breaking the skin while plucking after the bird is scalded. Do the plucking as quickly as possible.

Plumping.—Before plumping, hang the bird, head downward, in a cool place to remove all animal heat from the body. To plump simply hold the bird in cold water for a short time. This improves them whether dry-picked or scalded. In cold weather, some breeders prefer keeping the birds out of cold water and simply hanging them head downward, after they are thoroughly cleaned, in the open air to dry. Of course, this can be done only when the weather is cold.

Packing.

Packing Several Together.—When packing a number of specimens for the same destination, they can be put in a barrel or close box. Line these with manila or white paper (do not use printed, soiled or brown paper.) Pack them as closely as possible. The holes left can be filled with fine excelsior. In shipping to a critical market do not use straw or hay as it stains or marks the birds, which detracts from their value. Be sure no space is left for the birds to chuck around in transit. When the box or barrel is nailed up, designate its contents on the outside. It is bad practice to ship mixed lots of poultry in the same package when it can be avoided.

Packing One Bird.—Line a clean wooden box with two thicknesses of wrapping paper; be sure the paper has a smooth surface. Let the paper ex-

tend over the sides of the box. In this, make a good nest of fine excelsior. Put the bird on its back in the nest and cover it with the projecting paper. Put enough excelsior on top to prevent shifting and nail up the box. This method of packing a bird insures a fine appearance when it arrives at its destination. (See illustration).

VALUABLE POINTS FOR SUCCESSFUL TURKEY RAISING.

1. The young turkey should never be permitted to get wet; the slightest dampness is generally fatal to him.
2. Feed nothing from 24 to 36 hours after they are hatched.
3. Never use an old coop without first cleaning it thoroughly, inside and out, as described under "Coops".
4. Before putting the little poults into a coop, see that they are perfectly clean and free from lice. Dust them with a good insect powder at least twice a week.
5. Look for mites and large lice on the necks, heads and vents. Practically all the young poults that die, die from lice.
6. Keep the hen free from lice. Dust her every week with lice powder. Give her a good dust bath in which to dust herself.
7. For lice, grease the necks, heads and rumps with lard. Never use kerosene. Do not use too much lard and work it well into the down. If too much lard has been applied, the down will stick together.
8. Dirt and filth will make very short work of young poults.
9. Give water in shallow vessels so they can not get wet above the beaks.
10. Remove coops to new ground every day to avoid disease and furnish fresh grass.
11. Tend to the poults carefully until they are well feathered. Have them in the open on dry warm days.
12. An open shed, facing south, with a high roost is best for growing turkeys.
13. One mating of male and female fertilizes all the eggs laid in one season, so one male will be enough for 12 or more hens.
14. A good mating is made by two-year-old gobblers with pullets or yearling gobblers with old hens. It is better not to mate gobblers and hens of the same age.
15. Turkeys can be successfully hatched in an incubator and reared in a brooder until they are 3 months old, but in lots of no more than 25, because they require constant attention.
16. Do not mate a 40-pound gobbler with a little hen as injury is liable to result. Use a medium sized gobbler. The poults take their size more from the hen.
17. Many farmers use capons to mother young poults. They make splendid nurses.
18. One can tell a young gobbler by his masculine appearing head, heavy caruncles, the development of "tassels" on his breast, and his heavy build.

19. Do not keep adult turkeys in confinement. It will make them pine away.

20. If turkeys are fed in the barnyard every morning and evening they will not stray very far away. However they cannot be kept from roaming about.

21. Hen turkeys prefer making their own nests.

22. Feed little poults many times a day and they will eat with a relish. Do not overfeed.

23. Keep the best stock for breeding purposes. Build up the flock.

24. To insure the best egg production, keep the turkey hens in good shape when out of the laying season.

25. Do not feed a mash to grown turkeys. Feed whole grains, principally wheat, corn, and oats. Do not feed new corn to them in large quantities. Give old corn if possible and be on the safe side.

TREATMENT FOR DISEASES OF TURKEYS.

Blackhead.

This is a very serious disease which is common and most injurious to turkeys. It first attacks the blind intestine, situated between the large and small intestines. Then it attacks the liver, which becomes very much enlarged.

The disease is caused by a germ or microbe, which enters the digestive organs of healthy birds by means of food or water infected by the excrement of a sick bird. Eggs may also be a means of infection. While it is not proven that the germ or microbe is present within the egg of the diseased turkey, it no doubt often exists on the outside of the egg. For this reason the eggs should be carefully cleansed with a cloth wet in alcohol before they are put into the incubator or under the hen. It has been proved that adult fowls as well as sparrows, pigeons, etc., act as hosts to these microbes. Although they have a great degree of resistance, themselves, they are a means of infecting turkeys. Young turkeys being more susceptible, contract a more fatal form of the disease and nearly all die. For this reason it is much better to keep turkeys entirely separated from other fowls.

Symptoms.—The symptoms of blackhead are more frequently seen in young turkeys. The bird stands by itself with drooping wings and tail; shows a loss in weight and has no appetite. The head and comb show a dark purple color when the disease is at its height. Diarrhea is a marked symptom caused from inflammation and internal weakness.

Treatment.—The treatment is largely preventive as the use of medicine has not proved very successful.

Preventive Treatment.—The measures of prevention are summarized as follows:

The turkeys should be kept on fresh, new grounds and isolated entirely from any other fowls.

Keep very close watch of every turkey and at the first indication of disease, isolate the bird until the nature of the trouble is ascertained. To leg-band each turkey and keep a record of its weight from time to time would be a good plan. If it is found that any bird is losing weight, it should be regarded with suspicion and taken from the flock.

If blackhead exists in any of the poultry, the houses and feed boxes should be kept free from mice and rats, and the yards from sparrows or pigeons, as these have been known to carry the infection.

Frequent disinfection of houses, drinking and feed troughs.

Immediately burn the body of any bird dying of the disease.

In all bowel trouble of turkeys the feeding of boiled rice has proven beneficial, and it is largely practiced by experienced poultry men to prevent

the coming of the dreaded diarrhea. Avoid feeding wet or sloppy foods, and guard against the young poults taking cold.

Ten grains of sulphur mixed with one grain of sulphate of iron; or ten grains sulphur, one grain sulphate of iron and one grain sulphate quinine. This treatment should be repeated 2 or 3 times daily for considerable time to obtain results.

For turkeys under 3 months old give $\frac{1}{2}$ grain of copperas and $2\frac{1}{2}$ grains of salicylate of soda in the evening. Give epsom salts every 3 or 4 days, and keep the ground and feeding places well sprinkled with slaked lime.

Bowel Trouble.

Caution: Simple bowel trouble should not be mistaken for cholera or blackhead.

Indigestion is the prime factor in this trouble, and this is brought about by improper feeding, exposure to cold and dampness. Filth or lice may also be a cause.

Treatment.—The best cure is to remove the cause, which is generally improper feeding.

Rice boiled in milk until it is almost dry, is highly recommended for diarrhea.

The feeding of finely broken charcoal, will be found a great aid to digestion, and a safeguard against fermentation in the crop and gizzard.

Cottage cheese seasoned with black pepper has been very successful.

Mix equal parts of cloves, cinnamon, ginger and cayenne pepper. Mix one level teaspoonful of this in the mash for one dozen turkeys. When they are 4 or 5 weeks old, double the amount.

Chicken Pox.

This disease affects the head and comb of turkeys. It is also known as "sorehead."

It is caused by infection.

Symptoms.—Scabby eruptions about the head; there is a feverish condition and loss of appetite. If it is damp weather there may be cankers in the mouth and throat.

Treatment.—Isolate the affected poults; soak the scabs off with warm water; then wash the sores with a 2 per cent solution of carbolic acid or potassium permanganate.

Add just a little kerosene to every dish of drinking water as a preventive treatment.

Bathe head and eyes with equal parts water and witchhazel.

There is nothing better than vaseline for the eruptions.

Diphtheria.—(See "Chicken Department").

Gapes.

This is sure to prove a very troublesome and destructive ailment with young turkeys.

The cause is identical with that which is discussed under the head of Gapes in chickens. Some believe turkeys or chicks are infected with gapes by eating angleworms found in the ground, which is infected with gapeworm eggs, as these eggs may readily infect angle worms.

Treatment.—The same treatment discussed under Gapes in chickens is recommended.

Preventive Treatment.—Prevention is the main and most successful treatment. Cleanliness in poultry yards and houses. Some have recommended sprinkling the ground with water, into which has been mixed sulphuric acid; after 24 hours cover the ground with lime and turn under with a plow. Or a better way even is to remove the poultry to an entirely new ground.

Impaction of Crop.

Eating indigestible substances, such as dry grass, feathers, etc. The absence of grit and oyster shells tend toward bringing this disease.

Symptoms.—The crop is bulging and hard.

Treatment.—The crop can usually be emptied by careful manipulation. First give a teaspoonful of sweet oil and then work the contents of the crop with the fingers up through the gullet and out through the mouth; holding the bird with its head down.

Leg Weakness.—(See "Chicken Department").

Lice and Mites.

Symptoms.—Much the same as in other fowls, only that turkeys are much more susceptible to unfavorable conditions than other birds. They must be carefully protected from the effects of parasites, dampness and excessive heat, until they are able to wander away with the hen turkey. They thrive much better when not confined.

Treatment.—Turkeys are in more danger from the effects of parasites directly after they are hatched, so the best plan is to treat the hen turkey before they are hatched. The feathers should be thoroughly dusted with insect powder down to the skin, using great care not to get it into the eyes. This should be repeated several times a week, until a day or so before hatching. There is nothing better than the Persian insect powder, but any good insect powder which does not contain ingredients harmful to the eyes will answer. Never use lime or sulphur for this purpose, and kerosene should never be used to destroy lice on the body of the turkey. As soon as the turkeys are hatched examine them for lice. If present they will probably be found under the throat, on top of the head, about the vent or under the wing.

Sweet Oil and Lard: If lice are found, the use of a little sweet oil or fresh lard will destroy them. Rub a very little on top of the head and under the throat. The insect powder can be used for the rest of the body.

Limber Neck.

This is a paralysis of the muscles of the neck.

It is caused by absorbing poison from the intestines. The presence of the poison is due to indigestion or worms, or from eating decayed meats or moldy feed.

Symptoms.—The muscles of the neck become so relaxed they cannot support the head.

Treatment.—A good cathartic may effect a cure by cleaning out intestines and then removing the cause.

Give 1 tablespoonful of castor oil to which 15 drops of turpentine have been added.

A level teaspoonful of Epsom Salts in 6 of water is fine for limber neck.

Liver Disease.

Liver trouble is one of the most common diseases the turkey raiser has to contend with.

It is usually brought on by indigestion caused by overfeeding. If the digestive organs are overloaded and unable to perform their functions properly, part of the food decays before it has time to digest, and is as dangerous to health as food decayed before being eaten. The impurities or poisonous matter is carried into the blood circulation to various parts of the body. The liver acts as a filter or strainer, and it is here these impurities or microbes find lodging and proceed to develop.

Symptoms.—In old birds symptoms are inactiveness, listlessness, prostration, loss of appetite and a rapid loss in weight, accompanied by a yellowish discharge from the bowels. Young turkeys are usually affected when from two to eight months old. Some are taken very suddenly, while others droop around for several days. We have known young turkeys to eat a hearty supper, and to all appearances be in perfect health, the next morning refuse to eat and by night die. Others droop around a day or two. This trouble is not contagious. Turkeys are usually fed in the same manner, but some being stronger than others, are not affected as soon, but keep coming down one after another so that it appears contagious. If in the last stages of this disease a turkey is killed and examined, the liver will be found very much enlarged, and it may be found covered over with round, yellowish, sac-like bunches in which a pasty or cheesy substance is found; or if the disease is not fully developed, these sacs will contain a transparent liquid.

Treatment.—There are very few remedies for this trouble after it gets a start.

Preventive Treatment.—A good preventive is to take a gallon of wheat pour 5 or 6 tablespoonfuls of turpentine over it and over all pour boiling water and let stand over night. In the morning feed to the turkeys. Give wheat treated in this way once or twice a week. Turkeys should not be pampered or fed with unnatural food. Remember that it is natural for them to run about here and there seeking bugs, seeds, etc., getting plenty of exercise, as well as

food, the exercise being one of the most important factors in turkey raising. Very young turkeys should not be allowed to run when the grass is wet and deep, as becoming wet has an injurious effect on them.

Roup.

Roup is one of the most serious contagious diseases.

Infection with the disease germ; these germs are believed to be always where unsanitary conditions prevail.

Symptoms.—The first symptoms of roup are those of a severe cold; later a swelling develops under the eyes; there is discharge from the nostrils; eyes weak and watery, and the poult has difficulty in breathing.

Treatment.—Isolate the poult, and disinfect the quarters from which it was taken. Clean out the nostril passage. This may be done by:

Pressing against the roof of the mouth from the inside and squeezing the nostrils from above downward.

Syringing out the nostrils.

Dipping the fowl's head in a solution of disinfectant for a second or two. This method is safe only when permanganate of potash is used.

Wash the mouth and nostrils with 5 percent solution of carbolic acid.

Or use 50 percent solution of hydrogen peroxide to wash nostrils and mouth.

Scaly Leg.—(See "Chicken Department").

Tapeworm.

Turkeys are very susceptible to the injurious effects of the tapeworm and other worms.

Symptoms.—The birds will steadily lose flesh in spite of a good appetite. They appear indolent and drowsy. If the droppings are watched pieces of the worm will be found, looking like narrow tape.

Treatment.—If a tapeworm is even suspected, give the bird one teaspoonful of castor oil in which has been mixed six drops of oil of male fern. Give this in the morning. It will be better if the feed has been light the night before. Give one more teaspoonful of castor oil in a light mash 2 hours after giving the male fern. Withhold all food for 3 hours after giving worm medicine, and then give a warm soft meal. Continue this diet for 2 days.

A drop of kerosene given night and morning after the turkeys are 2 or 3 weeks old, is good for worms.

Oil of turpentine is an excellent remedy.

One-half teaspoonful Epsom Salts dissolved in a little warm water and poured down the throat is good. Or add a tablespoonful of salts to a quart of drinking water, giving no other drink.

Tuberculosis.—(See "Chicken Department").

White Comb.—(See "Chicken Department").

DUCKS.

The average farmer has all the facilities necessary to raise a large number of ducks and he can make it a profitable source of revenue. It is not necessary that he should have a pond or creek on the place, to be successful in the business, because many successful breeders have nothing but wells. The only difference that can be noticed between "water" and "upland" ducks is the cleaner, prettier plumage of the former.

Meat Breeds.—Pekin, Aylesbury, Muscovy, Rouen, Buff, Cayuga and Swedish.

Egg Breeds.—Indian Runner.

Ornamental Breeds.—Call, Black East India, and the Crested White.

Weights.

Breed	Adult Drake Pounds	Young Drake About Pounds	Adult Duck Pounds	Young Duck About Pounds
Pekin.....	9	7 $\frac{3}{4}$	8	6 $\frac{3}{4}$
Aylesbury.....	9	7 $\frac{3}{4}$	8	6 $\frac{3}{4}$
Muscovy.....	10	7 $\frac{3}{4}$	7	5 $\frac{3}{4}$
Rouen.....	9	7 $\frac{3}{4}$	8	6 $\frac{3}{4}$
Buff.....	8	6 $\frac{3}{4}$	7	5 $\frac{3}{4}$
Cayuga.....	8	6 $\frac{1}{2}$	7	5 $\frac{3}{4}$
Swedish.....	8	6 $\frac{1}{4}$	7	5 $\frac{1}{4}$
Indian Runner.....	4 $\frac{1}{2}$	3 $\frac{3}{4}$	4	3 $\frac{1}{4}$
Call.....	Bred for	small size.		
Black East India.....	Bred for	small size.		
Crested White.....	7	5 $\frac{3}{4}$	6	4 $\frac{3}{4}$

Common Breeds.—Of the above breeds the most prominent are the Pekins, Aylesburys, Muscovys, Rouens and Indian Runners.

Pekins.—The Pekin ducks hold first place as being the most popular breed of all, both to the commercial duck raisers and the general farmer. The Pekins are smaller than the Rouens, Muscovys or Aylesburys but they have long, deep bodies, capable of carrying a large amount of flesh in proportion to their size. They are easy fatteners, rapid growers, and good breeders. Pekin ducks are hardy, fair layers and practically non-sitters. They are especially adapted to the production of flesh. When the ducklings are ten days old, they will thrive under any reasonable conditions and they grow very rapidly, reaching a weight of about 10 pounds per pair when 10 weeks old. Pekin ducks are docile and easily confined by low fences. All of these characteristics combined are what have made the Pekins so popular.

Color.—Creamy white with orange-colored bills and legs.

Aylesburys.—The Aylesburys are a little larger than the Pekins which they resemble in many ways. They are white skinned and quick maturing but not quite so hardy as the Pekins. They appear to have practically all the qualities which have made the Pekin so popular, and can be kept successfully on either commercial or general farms.

Color.—Pure white.

Muscovys.—The Muscovys are the largest of the breeds but are not generally considered as good for market purposes as the others, because of the difference in size between the drake and the duck. They are easily distinguished by the crest-like formation of feathers on the head of the duck which stands up when the bird is alarmed and the large red face of both the drake and duck. A peculiar thing about the Muscovys is that they do not quack like other ducks. They are strong of wing and will fly all over the farm for exercise if the wings are not clipped. They are not greatly esteemed as layers but sometimes a few good layers are found. The meat is good when the birds are young, but as they grow older, it becomes rather coarse and tough. Muscovys are the only ducks of these practical breeds that prepare nests and deposit their eggs. All others must be penned at night, or they will scatter them broadcast. They are unusually good foragers, requiring very little care, and can be kept with a fair degree of success by general farmers.

Color.—White variety; pure white; pale orange or yellow legs, flesh-colored beak. Colored variety: lustrous blue-black, broken with a little white on body, breast and back; wing coverts lustrous blue-black, broken with white; tail, black; bill, pink; legs, yellow or dark leaden.

Rouens.—The Rouens are decidedly beautiful and this accounts for much of their popularity. They are not as desirable a market duck as the Aylesbury or Pekin. They are slower to mature than either; they have dark pin feathers and are not as good layers. They are not adapted for commercial duck farming, but they can be kept successfully by fanciers or on general farms.

Color.—Drake; brown back, mixed with green; green head and tail; neck has white ring around it; breast claret; wings have a wide purple bar with narrow white bars on either side the purple. *Duck*; barred on wings like drake; brown penciled plumage on body.

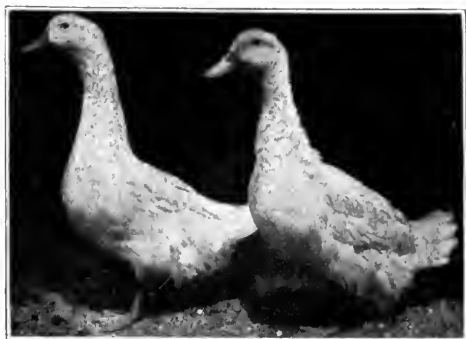
Indian Runners.—This breed is much smaller than breeds of the meat type so fails as a market duck. Its stronghold is its laying qualities. A record of 160 eggs a year is not at all remarkable for them. Their eggs are larger than hen's eggs but smaller than those of other ducks. Indian Runners are non-setters, hardy, good foragers and active. They can be told by their upright carriage and instead of waddling as other ducks do they run rapidly. There are three varieties—the Fawn and White, the White and the Penciled.

Housing.

Houses similar to hen houses can be used for breeding ducks. A certain size coop will be suitable to house many more ducks than chickens. For instance, a flock of fifty ducks will thrive in an inclosure that would not do for half that



Indian Runner.



Pair of Pekin Ducks.



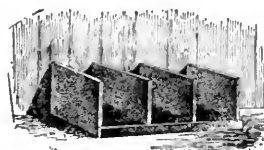
Rouen.



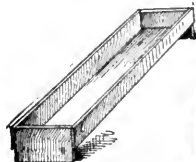
White Muscovy.



Crested White.



Nests for ducks.



—Flat water trough.



Gutter water trough.

number of chickens. However, ducks cannot stand as much confinement as a hen. They are more like turkeys in that respect. A single boarded shed from 12 to 15 feet deep, 7 feet high in front and 4 feet in the rear, made wind and water proof by covering with prepared roofing, makes a suitable building for this purpose. A good front is made by one window, covered with a good-sized muslin curtain in front of each pen. The house should be well ventilated. The floor can be of dirt raised 5 to 8 inches above the ground level, provided that the soil is well drained, or board raised 6 to 8 inches above ground level and covered with 3 or 4 inches of dry sand or earth. Partition must be from 2 to 2½ feet high. For breeding ducks in houses, an alley is not required unless the house is over 15 feet deep, but it is often used in growing pens and brooder houses. The floor should always be covered with plenty of litter, as they do not mind the cold if they can keep their feet warm. Cold feet affects a duck as badly as a frozen comb does a hen. Ducks should be permitted to make their own nest. They are likely to break their eggs unless nest boxes are used similar to those illustrated. Six to seven square feet of floor space should be allowed for each duck. The house should be as convenient as possible to save time. Many people overlook the item of labor in raising poultry, and by doing so materially reduce their profits.

Breeding.

Selecting Stock.—Only healthy, active, medium-sized females should be used for breeding. Extra large specimens seldom prove as satisfactory as do those of medium size, or a little larger. They should be matured and well proportioned. Pick out ducks with short necks, flat backs, medium long bodies, and of good depth to the keel bones.

Caution: Avoid ducks with watery eyes as it is generally a sign of weakness. Ducks should seldom be kept over two years unless they are extra good breeders and layers.

How to Tell a Drake.—In the colored breeds the difference in the sexes is easily told by the difference in plumage but in the white breeds the sexes are of the same color. However, the drake can be told in the white breeds as he has a more masculine and coarser appearance, and two of his tail feathers curl over into a short curl. Drakes cannot always be told by their tail feathers as they sometimes get pulled out. A surer way is to notice the quack. A duck quacks and has a deep bass voice, while the drake hisses and his voice is very soft.

Number of Females to a Male.—Ducks are usually mated in flocks of about 30 females with 6 or 8 males. One may reduce the number of males about March 1st and again near the 1st of April, making the proportion after the first reduction 1 male to 6 females and after the second reduction 1 male for 7 to 10 females. The males do not fight one another.

Care of Breeding Stock.—The stock is not seriously troubled by any degree of cold, but if early laying is desired, the birds should have some protection from storms and should be kept out of drafts. The litter should be kept clean and dry. The layers should be shut up at night or they will scatter

their eggs all over the place. They may even lay them in a pond and they will be lost. The eggs should be gathered early in the morning. Ducks lay early and the eggs may freeze. They should have their liberty during the day. It is not necessary for them to have a pond to swim in, but a good swimming place seems to increase the fertility of the eggs.

Incubation.

Time Required.—The eggs of all breeds of ducks require 28 days for incubation, except the Muscovy duck which requires from 30 to 35 days.

Eggs for Hatching.—The first eggs the duck lays, if confined and fed rather stimulating feeds, seldom hatch well.

Eggs for hatching must be fertile and strong. They can be made this way only, by having the stock properly mated and full of health and vigor.

Eggs from overfat breeding stock, seldom produce a big percent of strong young ducks.

If the eggs are dirty they should be cleaned. Washing does not seem to injure their hatching qualities.

Hatching With Hens.—Practically all duck eggs not hatched in incubators are hatched under hens because ducks do not make satisfactory setters. Before a hen is set she should be thoroughly dusted with insect powder. If several hens are sitting in the same room they should each be confined to their nests and let off once a day for feed and water. If a large number of hens are used for hatching, as many of them as possible should be set at a time, and the ducklings raised in brooders. Hens must be well taken care of in hatching duck eggs because they have to set a week longer. After the ducklings pick the shells it generally takes from 24 to 48 hours for them to hatch. For this reason it is best to allow the hen to get off the nest for food and water when the first duckling picks its shell and then keep her on the nest for the remainder of the hatch. The eggs should be sprinkled with warm water previous to hatching, because ducks' eggs require more moisture than hens' eggs at hatching time.

Number of Eggs to a Hen.—Put about 9 eggs under a hen in cold and 11 in warm weather.

Artificial Incubation.—The main points on incubation are given in the chicken department and we will not repeat them here. We shall only mention a few special points which apply directly to incubating duck eggs.

Temperature.—An incubator is generally kept at a slightly lower temperature in hatching ducks' eggs than in hatching chickens' eggs. It should be run at 103 degrees the first three weeks and 104 degrees the last week.

Supply Moisture.—It is always advisable to supply moisture by: Introducing a pan of water, a wet sponge, or a dish of moist sand below the egg tray.

Sprinkling the eggs with water heated to about 100 degrees Fahrenheit.

Soaking or sprinkling the floor to the incubator room.

Placing a pail of warm water under the lamp.

Keep Machine Closed at Hatching Time.—The machine should be shut

up tightly at hatching time to retain the moisture in the incubator. It takes duck eggs quite a while to hatch, even after the eggs are pipped.

Turning and Cooling.—The eggs should be turned twice each day beginning the third and through the 24th day, and cooled once each day beginning the 8th and through the 26th day. In two tray machines reverse the trays end for end and from one side of the incubator to the other, after turning the eggs.

Broken Egg Shells.—As the ducklings are hatching, the broken eggshells should be removed every 6 or 7 hours to prevent them from slipping over the pipped eggs, which means death to the imprisoned ones.

Gauge Machine Higher When Birds Are Out.—As soon as the ducklings are all out of the shell, the machine should be gauged one degree higher. This is because the eggs radiate a great deal of heat just before hatching, and the duckling, when first out, absorbs it, being about like a little sponge. In other words, the rapid evaporation which takes place produces cold. After the birds have dried off, the machine will run at least two degrees lower than when they were still in the egg. They should be kept in the machine from 24 to 36 hours after hatching before they are removed to the brooder.

Testing Eggs.—Directions for making an egg tester are given in the chicken department. Every egg should be tested at least twice during incubation, and the infertile and dead germed ones taken out. It is best to do this on the 7th and 14th days. Dead germs decompose rapidly and soon send off an odor. White shelled eggs can sometimes be tested successfully the 4th or 5th day. Hold the large end of the eggs up when testing. This shows the condition of the embryo and the air cell.

Fertile and Infertile Eggs.—A fertile egg exposes a small dark spot with little blood veins extending in all directions if the embryo is living. If the embryo is dead the veins will have settled away from it towards the edge of the yolk, forming an irregular circle of blood which is called a blood ring. After the 14th day the eggs which have strong living embryos are dark and partly filled up. They also show a distinct line of demarcation between the growing embryo and the air cell, while dead germs lack this distinct line and are only partially developed.

An infertile egg appears practically fresh, i. e., looks perfectly clear.

Brooding.

See Brooding in chicken department. It is important in brooding ducks not to have too much heat, as it means weak legs. They do not need quite as much heat as chickens. Start the brooder at about 95 degrees Fahrenheit and after the first 6 or 10 days reduce the heat to about 80. The reduction of heat depends upon the season. At first the ducklings should be kept around the hover to teach them the source of the heat. Artificial heat can be removed after about three weeks. The brooding systems used for chickens are also good for ducks.

Brooding With Hens.—Ducks can also be brooded successfully by hens.

If hens are used it is better to keep the hens confined and allow the ducklings free range, for hens are inclined to wander off too far with them. The young ducks grow surprisingly fast and soon adapt themselves to new conditions.

After they are 3 or 4 weeks old, the ducklings can be kept in a cool house where they will eat better and grow faster. When warm weather comes no more than a roof or sun shade is necessary for them. In fact, any more housing may be detrimental. The young birds need protection from both sun and rain, but they must have exercise and fresh air. Their pen should be kept as clean as possible. As they grow older it will be found advisable not to have too many in one pen—no more than can be killed at one job. Ducks put on flesh rapidly but they also fall away rapidly when excited.

Handling.—In handling ducks pick them up by the neck, and do not grasp them any tighter than is necessary to hold them. Never pick a duck up by the legs because they are too easily broken.

Feeding Methods.

Ducks can be fed successfully on the same rations given for chickens, but it is better as a rule to feed more mash feed and a larger proportion of vegetable and green feeds. When ducks are raised for the green ducklings (green ducklings are those which are grown very rapidly and marketed when from 8 to 12 weeks old. They weigh from $4\frac{1}{2}$ to 6 pounds each), they are fed a maintenance ration only, after they have stopped laying in the summer until about the first of December. Then the amount of mash is increased and a laying ration given. Where ducks are kept for egg production they should be given a laying ration the year around. Ducklings and ducks should be fed on flat clean boards instead of in troughs. They are rapacious eaters and will stow away a lot of food. If too concentrated, too rich, they will overeat and go off their feed. When they have free range and a swimming place they can stand heavier feeding than when confined. The ration may be mixed and made up in many different ways but it is generally best to feed it in the form of a moist mash.

Ducks should always have plenty of good clean water before them. They have no crops so they must have water to help wash the food into the gizzard.

Feeding Ducklings.

Methods Gathered From the Most Successful Raisers in the Country.—Ducklings should not be fed until they are from 24 to 36 hours old. They should always have plenty of water right by their feeding place because ducks need water to wash down their food. The water should be deep enough for them to run their bills in up to their eyes, as it keeps their nostrils washed out and prevents disease.

Five times daily, beginning early, feed them on a mixture of equal parts, by measure, of bread crumbs and rolled oats. Into this thoroughly mix 3 per cent of sharp sand. Beginning the 4th day change this feed to equal parts corn-meal, rolled oats, bran and bread; then after the 7th day to three parts bran,

one part each of corn meal and low grade wheat flour, 5 percent of beef scrap, and 10 percent of green feed, with about 3 percent of sand or other grit in each ration.

After the 7th day, feed the ducklings four times daily until they are about 2 or 3 weeks old, then drop down to three times daily. The grit or sand may be fed either in a hopper or in the mash after the young birds are a week old, but it is usually fed in all duck rations. As a rule, beef scrap is not fed until the ducklings are a week old, then 5 percent is given in the ration. This is increased gradually so that at the end of the 3rd week it is 15 percent. If the ducks are to be marketed, the proportion of corn meal should be gradually increased and the proportion of bran gradually decreased until the rations is the same as the fattening ration given below. Those saved for breeding purposes should be given the above ration with the increased 15 percent of beef scrap, but should not be fed a fattening ration. They should have a good range where they can have plenty of grass and water, running water if possible. If the ducklings are confined in yards a great deal of vegetables and green feed should be given.

Fattening Ration.—Fatten the ducks to be marketed for two weeks on the following ration: two parts by weight of low grade flour of middlings, three parts of corn meal, one part of bran, one-half part of beef scrap, with 10 percent green feed and 3 percent grit. This mash is fed three times daily.

Another good mixture is: 3 parts corn meal, one part each of bran and low grade wheat flour, 3 percent oyster shell, 5 percent beef scrap, with grit and green feed added.

Green feed tends to produce a flabby, rather than firm flesh, and to color the meat, so it may be well to leave it out the last week of fattening. Nevertheless one can keep the birds in better feeding condition with the green feed in the ration.

Boiled fish may be substituted in place of beef scrap. This should not be fed, however, within 12 days before the birds are to be marketed, because it tends to give the meat a fishy taste.

Another good system for feeding ducklings is as follows: When two weeks old feed a mixture of equal parts shorts, bran and corn meal. Mix these together and moisten with new milk. Gradually decrease this and add middlings. At two weeks begin to add meat scraps. Gradually increase this until at the end of 7 weeks it comprises about $\frac{1}{8}$ of the feed. Have 10 percent of sharp sand or grit in each feed. (A duck has no crop, the food going directly to the gizzard; they must have grit to help grind it.) Feed the birds all they can eat three times daily. Have plenty of water before them.—Recommended by E. Albertson, Seattle, Wash.

The first few days feed one part meal, two parts bran, one-half part sharp sand. Mix with raw eggs taken from the incubator—3 eggs to a quart of feed. Keep this mixture before the ducklings the first four days. Give them plenty of water. On the fifth day begin feeding the mixture four times daily, adding a little No. 2 flour and beef scrap. Gradually decrease the amount of eggs and increase the amount of beef scrap. Beginning the 4th week feed the following

mixture: 2 parts corn meal, 3 parts bran, 1 part each of beef scrap and No. 2 flour. This can be fed until the ducks are sold. If the trade demands fatter birds the amount of corn can be increased.—F. H. Fehrenschild, Westwood, New Jersey.

Feed a mixture made as follows: Two parts each of corn meal, ground oats, and middlings. For every 6 quarts of these, add a large handful of fine sand and one quart of meat scraps. Mix thoroughly and wet up just a little more than for chicks. Feed four times a day. When the ducklings weigh about 2 pounds apiece, add 2 parts of cracked corn to the mash each night. You can almost see them plump up. They will be ready for market when about ten weeks old. Sell them just before the pin feathers start, because ducks shrink in flesh as the feathers come out.—Merrill Hutchinson, Reading, Mass.

When the ducklings are 36 hours old, feed them oatmeal moistened with sweet milk. Feed this five times daily the first week, then add one feed of shorts and bran and a little beef meal once a day for the second week. The third week discontinue the oats and give bran twice a day, and Kafir corn once a day. When ten weeks old feed only morning and evenings.—Mrs. Henry Shrader, Wauneta, Kans.

The first two or three days feed the ducklings the following mash: 1 part corn meal, 2 parts wheat bran, one-half part middling and 5 percent sand. When three days old add 5 percent meat scrap and one-third green stuff to this ration. Feed until birds are about 6 weeks old, then feed the following mixture: One part each of bran, dry brewer's grains, corn meal and middlings. To this add one-third part green stuff, 10 percent meat scrap and 5 percent sand.—Evergreen Poultry Farm, Glassboro, N. J.

Feed a mash of prepared poultry feed, beef scrap, sand and finely cut cow-pea vines the first three weeks. The 4th week begin feeding a mash of one-half each wheat middlings and prepared feed. The 6th week start using all wheat middlings. The 4th week gradually begin increasing the amount of green stuff and beef scraps. Feed the ducklings 5 times a day the first two weeks and then three times daily—6 a. m., noon and 5 p. m. First three weeks feed all they will eat but do not crowd them the last seven weeks.

First week feed four times daily on bran and bread or cracker crumbs mixed with a little fine sand. The second week begin feeding just as often, one-third each of bran, corn meal and bread or cracker crumbs, adding a little meat meal and fine sand. The fifth week begin giving equal parts bran and corn meal, 10 percent sand and meat meal, and mix in a little cut clover. Feed four times daily if confined.—Edward G. Norman, Marietta, Pa.

Feed four times daily the following mixture: 1 part each shorts, rolled oats, corn meal and bran, and blood meal, 1 teaspoonful to each quart of feed. Dampen this with skim milk or water until it crumbles. Keep green food, water and grit before the ducklings at all times. The second week begin feeding the above ration, but use 2 parts of bran instead of one part, and a tablespoonful of blood meal to each quart of food instead of a teaspoonful. Keep grit and water before them.—F. D. Fowler, Carlinville, Ill.

When milk can be fed reasonably, the rations given for crate-fattened

chickens, will give good results in fattening ducklings. This method will produce a well-bleached green duck.

Celery seed is often used in fattening ducklings to flavor the flesh.

For the first 5 days of feeding, give the following mixture: Equal parts by measure of corn meal and cracker or bread crumbs; hard boiled eggs, 15 percent of total bulk of crackers and meal; sand, 5 percent of the total of meal and crackers. Mix thoroughly with milk or water and feed four times daily.

From 5 to 20 days old the following mixture (by measure): One part corn meal, 2 parts bran, rolled oats 50 percent of this bulk; sand and beef scraps each 5 percent; green feed 10 percent. Dampen with water to a dry crumbly state. Feed four times daily.

From 20 to 42 days old feed the following four times daily (by measure): 2 parts wheat bran; 1 part corn meal; sand 5 percent of this bulk; beef scraps 5 percent; green feed 10 percent. Moisten with water to a dry crumbly mass.

From 42 to 70 days old feed four times daily the following: 1 part (by measure) wheat bran, 2 parts corn meal; beef scrap 10 percent of this bulk; green feed, 10 percent; coarse sand, 5 percent. Mix with water to a crumbly mass.

Hours for Feeding.—6 A. M., 10 A. M., 2 P. M., and 6 P. M.

Feed for Breeding Ducks

The ducks that are kept for breeding and not for egg production should be kept on a grass range if possible and fed on the following: 1 part each, by weight, or low grade wheat flour, corn meal and green feed, 2 parts bran, 3 percent grit, 9 percent beef scrap. Dampen slightly. Give this sparingly once or twice every day, with one feed of mixed grains.

Another good mash for breeding stock is as follows (by measure): 4 parts bran, 3 parts corn meal, $\frac{3}{4}$ part beef scrap, 2 parts low grade wheat flour, and 2 parts green feed. Add a little shell, grit or other mineral matter to this and make a wet mash. Feed sparingly once or twice daily, with one feed of mixed grains.

In feeding breeding stock give them very little hard, dry grain, but more of the following mash: 2 parts each of oats, cracked corn, wheat shorts and meat scraps. Keep a supply of sand or other grit near the feeding trough.—Merrill Hutchinson, Reading, Mass.

For breeders: Morning food, equal parts bran and shorts; corn and oats chop; 5 percent each fine grit and beef scrap; 20 percent green cut clover. Feed wheat or oats at noon. Evening feed same as morning. For variety give green or boiled vegetables. Keep flock on grass range with plenty of water.—W. E. Ritter, Williamsport, Pa.

Feed breeding stock the following: equal parts wheat bran and corn meal, 10 percent green rye with cut clover, same of beef scrap. Mix a little grit in the food and keep ground oyster shells and grit by them.—James Rankin, So. Easton, Mass.

Begin feeding the breeding stock early in June the following: one part each wheat middlings, dried brewers' grains, and corn meal, three parts bran.

To this add five percent each sand and meat scrap, and $\frac{1}{4}$ green feed. Feed this twice a day until November 1st. Then feed as follows: one part each of bran, dried brewers' grains and middlings, two parts corn meal, to which add one-third to $\frac{1}{4}$ green stuff, 5 percent sand and 15 percent meat scraps. Feed night and morning. At noon give: one part each whole oats and cracked corn. July 1st begin feeding first ration again.—Evergreen Poultry Farm, Glassboro, N. J.

Feed breeders same as market ducks until about eight weeks old then feed twice a day on the following mash: two parts meal, three parts bran, one part No. 2 flour, and $\frac{1}{2}$ part beef scraps. About December 15 change the feed to seven parts each of bran and meal, two parts beef scrap, and three parts No. 2 flour. Also feed green stuff such as beets, potatoes, cut clover or apples until the birds have grass again in the spring.—H. H. Fehrenschild, Westwood, N. J.

For breeders feed night and morning by measure: one part each corn meal and rolled oats, four parts bran, and two parts shorts. Dampen with water or skimmed milk until it is a crumbly mass. Three or four times each week add ground meat and oil meal to the ration. Feed all they will eat in about 15 minutes. Remove what is left. Have grit, oyster shell, green feed food and water constantly before them. Give free range from 9:30 a. m. to 6 at night.—F. D. Fowler, Carlinville, Ill.

Feed breeders three times daily on: one part each of ground oats and corn meal, two parts bran, four parts green corn or cut clover chopped fine, a little grit and beef meal.—C. E. Bradley, Lake City, Iowa.

Keep the breeding stock on a grass run with plenty of water. In the morning feed following mash: one gallon bran, two quarts of shorts, one-half pound beef scrap, one-half pound oyster shell, mixed thoroughly with sweet skim milk. Give Kafir corn or corn at night.—Mrs. Henry Shrader, Wauneta, Kans.

Give breeding stock free range in a swamp where they can get plenty of bugs, insects, mud frogs, etc. Feed bran mornings and corn evenings, also plenty of meat scraps.

This is a good mixture for breeders: equal parts of wheat bran, corn meal, and green feed, also 5 percent each of coarse sand or grit and beef scraps.

A ration for laying ducks is recommended as follows (by measure): corn meal, 50 percent; green feed, 15 percent; wheat bran, 15 percent; beef scraps, 12 percent; grit or coarse sand, 8 percent. Dampen to a dry crumbly state and feed night and morning.

Laying Ducks.

Two parts each of oats, wheat and barley to one quart each buckwheat and corn ground together and 15 percent of fish scrap added. This is a splendid laying ration if the fish can be conveniently obtained.

A good formula for feeding Indian Runner ducks for eggs is as follows: 100 pounds bran, 100 pounds corn chops or meal, 100 pounds white middlings, 50 pounds beef scraps, 50 pounds alfalfa meal. Mix with hot water before

feeding in cold weather. In a box keep a mixture of two-third grit and one-third shell, with lots of good bedding for them in the house. Feed them once a day when on range and twice a day when confined.

Begin feeding Pekin ducks for eggs about December 1st. Feed the following both morning and night: one pound each of low grade flour or middlings corn meal and bran, 15 percent each of beef scrap and vegetables or green feed, also some grit. When laying heavily, feed the following at noon: one quart of mixed wheat and corn to every thirty ducks. Feed these rations throughout the year to any ducks kept principally for egg production. Thirty laying Pekin ducks will eat about ten quarts dampened mash each meal.

A good laying ration is as follows: two parts bran, one part corn meal, one part wheat middlings or low grade flour, 10 percent alfalfa or clover and 5 percent beef scrap.

Give the layers the following: three parts (by measure) wheat bran, two parts of Indian corn meal, one part each of low grade flour and beef scrap. Salt this slightly and dampen to a crumbly mass.

A good ration is as follows: Five measures each of bran and corn chop, two measures middlings, $1\frac{1}{2}$ measures beef scrap, three measures each of cut green stuff and boiled vegetables, and 5 percent sand.

Preparing for Market.

How to Kill.—To kill ducks stun them with a sharp blow on the head and then stick them through the throat or just back of the eye with a knife which has a narrow blade. To make them easier to handle run a hook in the mouth and out through the nostril.

When to Kill—Ducks should be killed just before the pinfeathers start or when about ten weeks old to make the best appearance. Pin feathers make a bird look coarse and unsightly.

How to Tell Condition.—The condition of ducks can be judged best by the amount of flesh on their backs.

Picking—Steam Picking Saves Artificial Drying.—Pull tail and wing feathers and throw them away before steaming the ducks. Six or eight ducks which have been stuck and bled can be steamed at a time. Hang them on hooks in the top of a barrel which is airtight and steam them from one-half to two minutes—until the feathers come off easily. Then pluck.

Removing Down.—The down can be removed very easily by sprinkling powdered rosin over the duck's body and dipping the bird in hot water. This melts the rosin so that the down and rosin can be rubbed off easily with the hand and leave the skin clean.

Plumping.—As soon as the feathers are off, no matter whether they are removed by steaming as given above or by scalding or dry picking, they should be put in cold water to remove the animal heat and harden the flesh.

Worth Remembering.—When but a few ducks are raised, they should be sold to local trade. Good money can be made from ducks sold in this way.

If the farmer wants to raise them to ship away, he must generally produce them by the thousands and do business on a large enough scale to warrant the outlay of a great deal of time and capital.

Valuable "Don'ts" in Caring for and Feeding Ducks.

- Don't feed any old time. Have regular hours for feeding.
- Don't overfeed, and keep on grass range if possible.
- Don't let the ducks be without plenty of oyster shells, charcoal, grit, sand and drinking water.
- Don't change the feed through the laying season.
- Don't make the mash too wet. Dry crumbly mash is best.
- Don't let the ducks sleep outside on damp, cold ground.
- Don't allow the ducks to make the ground sloppy around the drinking fountain.
- Don't keep more than thirty ducks in one flock.
- Don't give the ducks drinking water in shallow vessels.
- Don't yard ducks and other poultry together.
- Don't use poor beef scrap for feeding and don't feed too much.
- Don't feed ducks in pans. Feed in long troughs.
- Don't feed so much mash that it is not all eaten and becomes sour.

TREATMENT FOR DISEASES OF DUCKS.

Introduction.

Ducks are generally strong and free from disease. However, they are sometimes troubled by some of the same diseases that infect chickens. The symptoms and treatments of these diseases are generally the same.

Aspergillosis.—(See "Chicken Department.")

Catarrh.—(See "Chicken Department.")

Congestion of Lungs.—(See "Chicken Department.")

Cholera.—(See "Chicken Department.")

Diphtheria.—(See "Chicken Department.")

Sunstroke.

Too much exposure to the direct rays of the sun.

Symptoms.—Reeling and tottering over as if in a fit.

Treatment.—Remove the cause. Take the duckling out of the sun.

Caution: Do not allow ducklings in the direct rays of the noon-day sun. Many are killed this way.

Worms.—(See "Chicken Department.")

GEESE.

Varieties.—Gray Toulouse, White Embden, Gray African, White Chinese. Brown Chinese, Canadian or Gray Wild and Colored Egyptian.

WEIGHTS IN POUNDS.

	Old Gander	Young Gander	Old Goose	Young Goose
Toulouse.....	20	18	18	15
Embden.....	20	18	18	16
African.....	20	16	18	14
Brown and White Chinese.....	12	10	10	8
Canadian.....	12	10	10	8
Egyptian.....	10	8	8	6

Toulouse Geese.—This variety is bred in large numbers by farmers and is undoubtedly the most popular in America. They are not considered to be the best market geese, however, as their flesh is somewhat flabby and coarse. They make heavy weights on coarse feed but are late in maturing. Their late maturity gains the title for them of the Christmas goose. They are just about ready for market at Christmas time. The females of this variety are rather good layers, laying about forty eggs a season. The sexes are the same color—grayish on the breast and above, running to white under the body and in the rear.

Embden.—The Embdens are probably second in popularity in this country. They are about the same size as the Toulouse but their flesh is better for table use. They are practical birds for farmers, paying well for their keeping. The females are very good layers and setters. They do not lay as many eggs as the Toulouse geese but they are persistent setters. Their eggs are very large and white and have a rough, thick shell. The young of this variety are quick to mature. The male and female are both white.

African.—This breed is considered by many the most profitable to raise. They grow heaviest in the shortest time, as they will weigh from 8 to 10 pounds when only ten weeks old. The flesh is splendid for table purposes as it is highly flavored and fine. The females are excellent layers, averaging about forty eggs a season. These geese are light and dark gray. The neck plumage is light gray with a dark gray stripe running from the head to the body. The back is dark gray blending into light gray under the body. The tail and wings are dark gray. Considering the time and labor spent in raising them, this breed is a most profitable one to keep.

Chinese.—This is a practical variety for those who raise a limited number of geese. They are the smallest, also the noisiest of any variety. The females are excellent layers, averaging from fifty to sixty eggs a season. They can, no doubt, be bred up to become paying for their eggs alone. The young mature early and are quite hardy. The flesh is of the finest quality, being decidedly superior to other geese.

The Gray Chinese are the same color in both sexes, being a brownish gray on the upper parts and running into a lighter shade on the lower parts of the body. Like the Africans, they have a knob at the junction of the bill and skull. The Gray Chinese are smaller and more brown than the African. The White Chinese are pure white.

Canadian.—These are the wild geese that are so common to the country. They are among the best known of our domestic geese although more wild and harder to confine. They cannot be held in check without removing the outer joint of the wing. These birds are hardy and easy to rear. They are a fine table fowl. The females are good layers. This breed can be told by its black head and neck and the white stripe nearly covering its feet. The back is dark gray, breast light gray, becoming darker as it nears the legs, the plumage from the legs to the tail is white.

Egyptian Geese.—This is purely an ornamental variety kept for show purposes. They are the bantams of the goose tribe. The males are very quarrelsome. Two can seldom be kept in the same pen as they will fight to death. Their color is chestnut, gray, buff and black. There are but few of them in the country.

Management of Geese.

The conditions necessary for the successful raising of geese are almost entirely different from those necessary for successful duck raising. Geese require a much larger space than ducks. They need free range and water. There are many places on the farm that are useless for cultivation that could be turned into profitable runs for them. They will thrive on farms that have branches, streams, or unused springs on them. Farmers who profit by this add considerably to their annual incomes. Geese need very little care and attention in comparison with other poultry. If they have plenty of pasture on the farm and water, they will take care of themselves.

Water.—When running water is not available, geese should be watered in dishes deep enough for them to wash out their nostrils. This prevents the insects and dirt from bothering them too much.

Housing.—All that is necessary in the way of houses is protection from wind and storms. Cold weather does not ever inconvenience geese when they have a dry, well ventilated place to rest. Any shed-like structure is sufficient that is about six feet high in front and three feet high in the rear, built any width and length that is large enough to accommodate the birds. Each member of the flock should have about ten square feet of floor space. It is advisable not to have a shed over twelve feet wide as it is liable to be damp. The house may be built of cheap lumber and covered with tar paper, or made

more durable by covering with a prepared roofing paper. The front of the shed can be closed with heavy cotton cloth curtains. The curtains may be fastened on frames to be swung open like hinged doors, or swung up and fastened with a hook. The main objection to the latter method is that when the curtains are in a horizontal position they catch dust. This makes them less sanitary and less able to admit air and light. These curtains may be left open continually in fair weather and closed only during the night in extremely cold weather or during storms that would beat through the openings and make the floor damp and uncomfortable.

Mating and Setting.

Number of Geese to Gander.—Mate from two to four geese with one gander.

Mating.—The breeding stock should be at least two years old and well matured. Geese live to a great age and frequently remain vigorous and lay a fair number of fertile eggs when thirty years of age. Of course, the ganders are not reliable after they are about eight years old. When convenient, it is a good plan to seclude each mating a week or two just at the beginning of the breeding season. The time will readily be determined by the actions and cries of the birds. As soon as the birds are rightly mated they may be permitted to run together as they will not mix nor mate over again. When a good mating is secured, it should be continued for six or seven years; *i. e.*, as long as the birds get results. Some breeders prefer old birds to young ones but we believe the characteristics of the individual are more important than the age.

The season for breeding begins about February, but some geese will begin laying earlier, say in December, then stop, and begin once more in February. No feed is necessary outside of what they pick up off the range until cold weather destroys this source of food. Laying geese must not be allowed to get too fat as it injures the fertility of the eggs.

Setting.—Geese make their own nests from the litter and straw on the floor of their house. They will lay from ten to twenty eggs before they become broody. Just as soon as a goose shows broodiness or an inclination to set, she should be removed and placed in a small coop or dark box, and kept there for two or three days with plenty of water to drink but no food. This will break her up and she can be put back into the yards to begin another laying of eggs. One should set the first and second laying of eggs under hens, giving four or five eggs to a hen. When the goose has laid the second laying of eggs, she will have to be confined and broken of her broodiness again, then she will lay a third lot. She should be permitted to set on the third laying herself instead of putting them under hens.

Time for Incubation.—Thirty days are required for the incubation of goose eggs.

Feeding Breeders.—When there is a scarcity of food in the fall or when the geese are laying, they should be fed. We give the following mixtures that have proved very satisfactory:

Equal parts, by measure, of corn meal, middlings and bran. To this add 5%

of beef scraps, and feed 10% of the bulk of the whole ration of steamed clover, green feeds, and cooked vegetables. Give a light feed of this ration in the morning, and at night feed cracked corn.

Morning and night feed what oats and corn the geese will eat up clean. At noon give vegetable food such as alfalfa, steamed clover, apple parings, etc. Let them to run in all kinds of weather.

In the morning feed equal parts of corn meal and shorts, mixed with 10% of beef scraps to a crumbly state. Feed only what they will eat up quickly. In the afternoon feed whole grain, barley, corn and oats. Put feed in small boxes. Also give vegetable feeds and plenty of good clean water and oyster shell.

By measure: 2 parts shorts, 4 parts each of bran and cut clover and 1 part corn meal. Dampen with water or skimmed milk to make a crumbly mass. Frequently add cooked vegetables and ground meat to this ration. Feed morning and evening. At noon give a light whole corn feed. Keep oyster shell and grit before them continually.

Care of Goslings.—The hen and goslings should not be disturbed for about twenty-four hours after the young birds are hatched. It is sometimes advisable to remove all but two or three of the little fellows as soon as they dry off. Some hens are clumsy and trample them to death if left on the nest with them. If the birds are removed, they should be kept in a warm place. This gives them time to dry off. After they are thoroughly dry the hen and brood should be put in a large, roomy coop for four or five days. When the goslings are about five days old they can shift for themselves in good weather. Before feathering, they are easily chilled and should be looked after during cold rains. When one is found chilled or cast on his back in the mud, he should be put into a warm place and kept until he recovers.

Feeds for Growing Goslings.

One-third shorts, two-thirds corn meal and 10% beef scrap. Moisten with water until crumbly and give them only what they will eat up clean three times daily for about a month.

For about the first forty-eight hours give nothing but tender grass, then feed every two or three hours two-thirds shorts and one-third corn meal. Wet up and then squeeze practically dry. Do not give sloppy food and feed sparingly. The second week give cracked corn and a run of grass.

Feed all the grass or lettuce leaves they will eat. At first give a mixture of bran and corn meal but feed whole grain later. Let the chief feed be grass or other green food and let them have plenty of water at all times.

As soon as the goslings are dry put them in brooders. After they are twenty-four hours old, feed them four times a day: 1 part each (by measure) of shorts, rolled oats, bran, and corn meal, blood meal, a teaspoonful to a quart of food. Dampen with water or skimmed milk until crumbly. Have grit, water and green food constantly before them. Give water in such a way they cannot get into it. Reduce brooder heat from 90 degrees until they need no heat at all then remove them to other quarters and feed three times a day: 1 part each (by measure) of rolled oats, bran and shorts, blood meal, a tablespoonful to a quart of feed.

Add cooked vegetables and corn meal occasionally. Mix with skimmed milk or water into a crumbly mass. Have water and grit before them. Do not allow the goslings in water until they are full feathered.

Start the goslings on fresh, green grass, then gradually add a slightly moistened corn meal to the ration. It is also good to mix a little sand and charcoal with the corn meal. Feed this three times daily for about two days, then change to the following ration: equal parts (by measure) of middlings, bran, and steamed cut clover or cooked vegetables. Feed this three times daily until the birds are eight weeks old then fatten for market.

After the first twenty-four hours, give the goslings fresh, tender grass to eat and water to drink. In a couple of days gradually begin feeding them finely cracked corn, well scalded, and permit them to run on tender grass. If they are confined, move their pen to a fresh grass spot every day. Feed them often. During stormy weather they must have green feed, such as tender grass, finely cut green oats, rye, or clover, given them. Protect them from rains until their feathers are grown. After that they need only come home to get grain food each night, when necessary.

Fattening Geese.

When geese are to be fattened they should be put in a pen small enough to keep them from running around too much. They should be allowed from eight to fourteen square feet apiece. Care should be taken not to frighten or disturb them. If geese are irritated in the least they will not get fat, but instead will grow another crop of feathers. When the tips of the wings reach the tail or when about ten weeks old, they will be ready for market, weighing from eight to ten pounds. It takes about two weeks to fatten young geese.

Fattening Rations.

Mix corn meal to a dry crumbly state and add twenty percent of this bulk of beef scrap. Salt slightly. Feed all the geese will eat clean, three times daily. During the middle of the day the birds may receive some whole grain, especially if it is soaked.

Famous Watertown Method of Fattening.—This method is given its name because it is practiced mainly by the farmers around Watertown, Wis. It is a new plan of fattening for this country, being started by some German farmers, but it is very successful and we feel that it should be taken to other farmers that they may reap its benefits. A demand for the geese, fattened in this way, can soon be created and they bring a high price. The method follows:

The geese are fed and kept growing fast until about Thanksgiving time, when they are confined and the process of fattening begun. As stated above, the birds that have been running at liberty are naturally shy and timid, and must be handled cautiously. The feeder must reconcile them to his presence. Strangers should not be permitted around their pens and everything should be done to gain their confidence. Feeding is begun gradually at first, the geese being fed only a little, three times a day. The number of meals and the

amount of feed are both gradually increased until the birds are really stuffed every four hours. It takes about ten days for full feed to be reached after the process is begun.

How to Make Feed.—A cooked feed is given and is made as follows: Two parts of ground and sifted barley or oats, one part wheat flour and one part sifted corn meal are well mixed together, moistened with water, and made into a stiff dough. This is worked into noodles about the size of small pork sausages. The dough may be run through a sausage mill and cut into the proper length as it comes out. The ends are moulded into a dull point with the fingers. This process makes noodles that are about three inches in length and one inch thick. The noodles can either be boiled or baked, preferably boiled. The noodles are put into a wire basket made from the same kind of wire that is used in ash sifters. The basket is just the right size to fit into a wash boiler. It is fastened a little off the bottom to prevent burning. When the noodles are thoroughly cooked they rise to the surface. Then the basket is taken out and immersed in cold water. This prevents them from clinging together. After being treated in this manner they can be heaped into a basket with no danger of their losing shape or sticking together.

How to Feed.—The goose to be fed should be confined in a small place off the pen. The feeder can sit on a stool with a pail of water and basket of noodles near him. He then dips a noodle in water, opens the bird's mouth and slips it in. The goose will readily swallow a few of them of its own accord, then the feeder gently pushes enough of them down its throat to stuff it full. When the bird is released it immediately drinks its fill of water, which should always be fresh. Each bird is stuffed in this way and then they are left undisturbed until the next feeding time. If at any time a goose has not digested all the food it was given before, it is not fed so much. If a bird goes off its feed, it must be put on the range for a couple of days. If it shows signs of indigestion, a feed or so should be skipped. Some feeders think it wise to reduce the feed once in a while, after they are on full feed, and then gradually bring them back. They will not become "stale" when treated this way.

This is a very simple method and one can soon learn to stuff a goose very quickly. It is practiced at a time of the year when there is practically nothing else to do on the farm and it will produce paying returns. It is a method that is fast gaining ground where its success is known.

Bran, Shorts, Scraps, Oil Meal and Corn Meal.—Keep confined closely and feed: two parts (by measure) of bran, one part each of shorts, beef scraps, oil meal and corn meal, moistened with sufficient water to make it crumble. Feed three times daily. Give whole corn once in a while. Grit, green food, and water should be constantly before them.—F. D. Fowler, Carlinville, Ill.

Corn Meal, Ground Oats, Middlings and Barley.—Feed one-half corn meal, one-fourth ground oats, and the remainder wheat middlings and barley. Mix together thoroughly and dampen with scalding milk or water. Feed as much of this ration as they will eat up clean four or five times daily. Give plenty of water.—Mrs. M. Swartsley, Columbus, Neb.

Alfalfa.—Turn geese into a field of alfalfa when old enough to fatten, and they will become very fat and heavy.—M. B. Caldwell, Broughton, Kas.

Killing and Dressing.—Geese are killed by sticking in the throat the same as ducks, then they are dry picked. About two inches of feathers should be left on the neck and on the wings at the first joint. After the feathers are taken off the down is wiped off by brushing the body with the hand moistened in water. The birds should be plumped in cold water for about an hour after they are picked. However, they should not be left in the water too long or they will become bleached and water-soaked. They are then ready for market.

Marketing.

It is better to market young geese some time in October. If possible they should be marketed before it turns cold weather because the cold makes them much harder to dress. The feathers are harder to pull, and one is more liable to tear the flesh.

TREATMENT FOR DISEASES OF GEESSE.

Introduction.

The same is true of geese as of ducks, if they are given free range and a dry, clean coop in which to retreat when necessary they are seldom troubled by any disease. The diseases which do overtake them have practically the same symptoms and require the same treatments as those of chickens.

Aspergillosis.—(See Chicken Department).

Cholera.—(See Chicken Department).

Congestion of Lungs.—(See Chicken Department).

Diphtheria.—(See Chicken Department).

Worms.—(See Chicken Department).

GENERAL LIVE STOCK INFORMATION

National Live Stock Breeders' Associations.

Stockmen and others interested in the production of live stock may secure booklets and circulars descriptive of the various breeds by applying to the secretaries of the respective associations:

CATTLE

Association.	Secretary.	Address.
American Aberdeen-Angus Breeders' Association..	Charles Gray.....	Chicago, Ill.
Ayrshire Breeders' Association.....	C. W. Winslow.....	Brandon, Vt.
Brown Swiss Cattle Breeders' Association.....	Ira Inman.....	Beloit, Wis.
American Devon Cattle Club.....	L. P. Sisson.....	Charlottesville, Va.
American Galloway Breeders' Association.....	Robert W. Brown....	Chicago, Ill.
American Guernsey Cattle Club.....	Wm. H. Caldwell....	Peterboro, N. H.
American Hereford Cattle Breeders' Association..	R. J. Kinzer.....	Kansas City, Mo.
Holstein-Friesian Association of America.....	F. L. Houghton.....	Brattleboro, Vt.
American Jersey Cattle Club.....	R. M. Gow.....	New York, N. Y.
Polled Durham Breeders' Association.....	J. H. Martz.....	Greenville, Ohio.
Red Polled Cattle Club of America.....	H. A. Martin.....	Gotham, Wis.
America Shorthorn Breeders' Association.....	Roy G. Groves.....	Chicago, Ill.

HORSES

American Association of Importers and Breeders of Belgian Draft Horses.....	J. D. Conner, Jr.....	Wabash, Ind.
American Clydesdale Association.....	R. B. Ogilvie.....	Chicago, Ill.
American Saddle Horse Breeders' Association. . .	Roger H. Lillard....	Lawrenceburg, Ky.
Percheron Society of America.....	Wayne Dinsmore....	Chicago, Ill.
American Morgan Register Association.....	T. E. Boyce.....	Middlebury, Vt.
American Shetland Pony Club.....	Miss Julia M. Wade.	LaFayette, Ind.
American Hackney Horse Society.....	Gurney C. Geel.....	Hempstead, Long Island, N. Y.
American Shire Horse Association.....	Charles Burgess, Sr..	Wenona, Ill.
German Coach Horse Association of America....	J. Crouch.....	LaFayette, Ind.
American Suffolk Horse Association.....	Alex. Galbraith.....	DeKalb, Ill.

SHEEP

American Cheviot Sheep Society.....	F. E. Dawley.....	Fayetteville, N. Y.
American Cotswold Registry Association.....	F. W. Harding.....	Waukesha, Wis.
Continental Dorset Club.....	J. E. Wing.....	Mechanicsburg, O.
American Hampshire Breeders' Association.....	Comfort A. Tyler....	Coldwater, Mich.
American Leicester Breeders' Association.....	A. J. Temple.....	Cameron, Ill.
American Oxford Down Record Association.....	W. A. Shafer.....	Hamilton, Ohio.
American Shropshire Registry Association.....	Miss Julia M. Wade.	LaFayette, Ind.
American Southdown Breeders' Association.....	Frank S. Springer...	Springfield, Ill.

SWINE

American Berkshire Association.....	Frank S. Springer...	Springfield, Ill.
O. I. C. Swine Breeders' Association.....	J. C. Hiles.....	Cleveland, Ohio.
American Duroc-Jersey Swine Breeders' Association	T. B. Pearson.....	Thorntown, Ind.
National Duroc-Jersey Record Association.....	J. R. Pfander.....	Peoria, Ill.
American Hampshire Swine Record Association..	E. C. Stone.....	Peoria, Ill.
American Poland-China Record Association.....	W. M. McFadden....	Chicago, Ill.
National Poland-China Record Company.....	A. M. Brown.....	Winchester, Ind.
American Tamworth Swine Record Association...	E. N. Ball.....	Ann Arbor, Mich.
American Yorkshire Club.....	Harry G. Krum.....	Whitebear Lake, Minn.

National and State Agricultural Departments and Institutions.

Bulletins and Circulars of Information pertaining to live stock and other agricultural topics can be secured from the national departments and from one's State Experiment Station that are helpful and the following list of departments and stations is submitted:

U. S. Department of Agriculture, Washington, D. C., Scientific Bureaus.
 Weather Bureau—C. F. Marvin, Chief.
 Bureau of Animal Industry—A. D. Melvin, Chief.
 Bureau of Plant Industry—W. A. Taylor, Chief.
 Forest Service—H. S. Graves, Forester.
 Bureau of Soils—Milton Whitney, Chief.
 Bureau of Chemistry—C. L. Alsberg, Chief.
 Bureau of Crop Estimates—L. M. Estabrook, Statistician.
 Bureau of Entomology—L. O. Howard, Entomologist.
 Bureau of Biological Survey—E. W. Nelson, Chief.
 Office of Public Roads and Rural Engineering—L. W. Page, Director.
 Office of Markets and Rural Organizations—C. J. Brand, Chief.

States Relations Service—A. C. True, Director.
 Office of Experiment Stations—E. W. Allen, Chief.

THE AGRICULTURAL EXPERIMENT STATIONS.

Alabama—College Station, Auburn, J. F. Duggar¹; Canebrake Station, Uniontown, L. H. Moore¹; Tuskegee Station, Tuskegee Institute, G. W. Carver.¹
 Alaska—Sitka; C. C. Georgeson.²
 Arizona—Tucson; R. H. Forbes.¹
 Arkansas—Fayetteville; M. Nelson.¹
 California—Berkeley; T. F. Hunt.¹
 Colorado—Fort Collins; C. P. Gillette.¹
 Connecticut—State Station, New Haven; Storrs Station, Storrs; E. H. Jenkins.¹
 Delaware—Newark; H. Hayward.¹
 Florida—Gainesville; P. H. Rolfs.¹
 Georgia—Experiment; J. D. Price.¹
 Guam—Island of Guam; C. W. Edwards.³
 Hawaii—Federal Station; Honolulu; J. M. Westgate.² Sugar Planters' Station; Honolulu; H. P. Agee.¹
 Idaho—Moscow; J. S. Jones.¹
 Illinois—Urbana; E. Davenport.¹
 Indiana—La Fayette; A. Goss.¹
 Iowa—Ames; C. F. Curtiss.¹
 Kansas—Manhattan; W. M. Jardine.¹
 Kentucky—Lexington; A. M. Peter.⁴

- Louisiana—State Station: Baton Rouge; Sugar Station: Audubon Park, New Orleans; North La. Station: Calhoun; W. R. Dodson.¹
- Maine—Orono: C. D. Woods.¹
- Maryland—College Park: H. J. Patterson.¹
- Massachusetts—Amherst: W. P. Brooks.¹
- Michigan—East Lansing: R. S. Shaw.¹
- Minnesota—University Farm, St. Paul: A. F. Woods.¹
- Mississippi—Agricultural College: E. R. Lloyd.¹
- Missouri—College Station: Columbia; F. B. Mumford.¹ Fruit Station: Mountain Grove; Paul Evans.¹
- Montana—Bozeman: F. B. Linfield.¹
- Nebraska—Lincoln: E. A. Burnett.¹
- Nevada—Reno: S. B. Doten.¹
- New Hampshire—Durham: J. C. Kendall.¹
- New Jersey—New Brunswick: J. G. Lipman.¹
- New Mexico—State College: Fabian Garcia.¹
- New York—State Station: Geneva; W. H. Jordan.¹ Cornell Station: Ithaca; A. R. Mann.⁴
- North Carolina—College Station: West Raleigh; State Station: Raleigh; B. W. Kilgore.¹
- North Dakota—Agricultural College: T. P. Cooper.¹
- Ohio—Wooster: C. E. Thorne.¹
- Oklahoma—Stillwater: W. L. Carlyle.¹
- Oregon—Corvallis: A. B. Cordley.¹
- Pennsylvania—State College: R. L. Watts.¹ State College: Institute of Animal Nutrition; H. P. Armsby.¹
- Porto Rico—Federal Station: Mayaguez; D. W. May.² Insular Station: Rio Piedras; W. V. Tower.¹
- Rhode Island—Kingston: B. L. Hartwell.¹
- South Carolina—Clemson College: C. C. Newman.⁴
- South Dakota—Brookings: J. W. Wilson.¹
- Tennessee—Knoxville: H. A. Morgan.¹
- Texas—College Station: B. Youngblood.¹
- Utah—Logan: F. S. Harris.¹
- Vermont—Burlington: J. L. Hills.
- Virginia—Blacksburg: A. W. Drinkard, jr.¹ Norfolk: Truck Station; T. C. Johnson.¹
- Washington—Pullman: I. D. Cardiff.¹
- West Virginia—Morgantown: J. L. Coulter.¹
- Wisconsin—Madison: H. L. Russell.¹
- Wyoming—Laramie: H. G. Knight.¹

¹Director. ²Agronomist in charge. ³Animal husbandman in charge. ⁴Acting director.

Dominion of Canada—Department of Agriculture and Office of Experimental Farms, Ottawa, Canada.

LIVE STOCK BIBLIOGRAPHY.

Many stockmen enjoy having a more or less complete library of books treating in detail and at length the numerous subjects and phases of live stock husbandry. A few of the best books on important subjects and two of the most generally read live stock periodicals follow. The publishers of "The Stock Book" will gladly help you to secure them:

"Types and Breeds of Farm Animals," Plumb.

"Judging Farm Animals," Plumb.

"Breeding Farm Animals," Mumford.

"Feeds and Feeding," Henry and Morrison.

"Dairy Cattle and Milk Production," Eckles.

"Beef Cattle Production," Mumford.

"Pork Production," Day.

"Sheep Management," Kleinheinz.

"Horse Production," Gay.

Live Stock Periodicals.

"Breeder's Gazette," Chicago, Ill. A weekly publication devoted to all classes of live stock.

"Hoard's Dairyman," Fort Atkinson, Wis. A weekly journal devoted to dairy farming.

MISCELLANEOUS

Normal Temperatures.

Horses from 100 to 101 degrees (Fahrenheit); cattle from 100 to 103 degrees; sheep from 101 to 103 degrees; hogs from 102 to 104 degrees.

In diseases a rise of four degrees is serious. The temperature of an animal is generally taken in the vulva or anus.

Normal Pulse Beat.

Horses from thirty to forty beats per minute; cattle from forty to fifty beats per minute; sheep from seventy to eighty beats per minute; hogs from seventy to ninety beats per minute.

To take the pulse of a horse stand on the left side and run the finger gently along the lower jaw bone until you feel the artery just at the front edge of the large muscles at the side of the jaw. To take the pulse of a cow stand on the left side but reach over the neck and feel the artery on the right side of the jaw. The pulse of sheep is generally taken on the inside of the hind leg.

PEOPLE'S TABLE FOR LIQUID MEDICINES.

Use this when there is no time for more accurate measurements.

1 small teaspoonful.....	60 small drops.....	$\frac{1}{4}$ tablespoonful.
1 tablespoonful.....	240 small drops.....	3 teaspoonfuls.
1 dram.....	60 drops.....	1 scant teaspoonful.
1 ounce.....	2 tablespoonfuls.....	6 teaspoonfuls.
1 teacupful.....	16 tablespoonfuls.....	48 teaspoonfuls.
1 minim.....	1 drop (generally).	
1 grain.....	1 drop (generally).	
1 pint.....	2 teacupfuls.	
1 wineglassful.....	3 heaping tablespoonfuls.	

STOCK FOODS AND CONDITION POWDERS.

Condition Powder for Horses or Cattle.

Black Antimony	6 ounces
Powdered Sulphur	5 ounces
Ground Poplar Bark.....	3 ounces
Powdered Resin	1 ounce
Powdered Alum	1 ounce
Cumin Seed	$\frac{1}{2}$ ounce

Give about one tablespoonful mixed well with the feed three times a day.

For Horses.

Sulphate of Iron, powdered.....	4 ounces
Nitrate of Potash, powdered.....	2 ounces
Ginger Root, powdered.....	2 ounces
Gentian Root, powdered.....	2 ounces
Nux Vomica Seed.....	2 ounces

Another Good Powder.

Sulphur	2 pounds
Glauber's Salts	1 pound
Black Antimony	8 ounces
Powdered Bloodroot	4 ounces
Copperas, powdered	8 ounces
Resin	8 ounces
Asafetida	4 ounces
Salt peter	8 ounces

Mix well and give one good tablespoonful in grain morning and evening.

Stock Foods.

Oil Cake	10 pounds
Powdered Licorice Root.....	5 pounds
Pulverized Fenugreek	5 pounds
Elm Bark	4 pounds
Salt	10 pounds

Mix well and give two good tablespoonfuls morning and night.

Good Milk Producer for Cattle.

Salt	10 pounds
Powdered Anise Seed.....	10 pounds
Bruised Fennel	10 pounds
Ground Clover	5 pounds
Cream of Tartar.....	1 pound
Alum	1 pound
Sublimed Sulphur	1 pound
Powdered Chalk	1 pound

Mix well and give each cow a big handful each morning in the feed.

A Simple Stock Food.

Common Salt	1 pound
Pulverized Fenugreek	4 pounds
Ground Flaxseed.....	7 pounds
Oil Cake	5 pounds
Powdered Licorice Root.....	4 pounds

Stir well together. Give each animal two heaping tablespoonfuls in the morning feed.

Chick Starter.

Fine Corn Meal.....	15 pounds
Middlings	15 pounds
Corn Gluten	9 pounds
Bran, Wheat	7 pounds
Thick Loppered Milk.....	4 quarts
Black Pepper	1 ounce
Charcoal	1 ounce

Mix these together in a tub and give plenty, as long as it is eaten clean each meal.

Egg Producer.

Coarse Corn Meal.....	9 pounds
Middlings or Shorts.....	10 pounds
Bran	7 pounds
Ground Oats	10 pounds
Corn Gluten	8 pounds
Salt, coarse	$\frac{1}{2}$ pound
Charcoal	$\frac{1}{2}$ pound
Thick Sour Milk.....	3 quarts

This can be dampened when it is given to the hens, if desired.

Egg Producer.

Powdered Bone, Lime or Oyster Shells.....	1 pound
Powdered Ginger	2 ounces
Ground Gentian	2 ounces
Capsicum	1 ounce
Sulphur	1 ounce

This should be well mixed and one teaspoonful mixed with each quart of feed.

USES AND DOSES OF OVER FIFTY STABLE MEDICINES.

Acetic Acid.—Soak warts well in pure acetic acid and it will remove them.

Aconite (Tincture).—Use 20 to 30 drops for cattle; 10 to 20 drops for horses; 10 drops for sheep; 1 to 5 drops for pigs. Good for inflammations and fevers. It relieves pain when applied externally in small amounts. Do not give when heart is weak. It is poisonous.

Aloes.—Use 2 to 3 tablespoonfuls for cattle; $1\frac{1}{4}$ to 2 tablespoonfuls for horses. This is a very good tonic.

Alum.—Use 3 scant teaspoonfuls for cattle; 1 scant teaspoonful for horses; 30 drops for sheep; 15 drops for pigs. This is good for diarrhea, and when dissolved in water is fine for sore mouth.

Alum (Burnt).—This is fine to shake on proud flesh or old sores.

Ammonia Water.—Use 2 tablespoonfuls for cattle; 1 tablespoonful for horses; 2 scant teaspoonfuls for sheep; $\frac{1}{2}$ to 1 scant teaspoonful for hogs. Dilute with water. Good as a stimulant, and in bloating, indigestion and colic.

Arnica, Tincture.—Use 2 tablespoonfuls for cattle; 1 to 2 tablespoonfuls for horses; 2 scant teaspoonfuls for sheep; $\frac{1}{2}$ scant teaspoonful for pigs. Checks fever and causes the animal to sweat.

Arsenic (Fowler's Solution).—Use 1 to $1\frac{1}{2}$ tablespoonfuls for cattle; $\frac{1}{2}$ to 1 tablespoonful for horses; 5 to 20 drops for sheep; 5 to 20 drops for pigs. Give after eating or in the food. Used for heaves and chronic diseases.

Asafetida Gum.—Use 1 tablespoonful for cattle; $\frac{1}{2}$ tablespoonful for horses; 1 scant teaspoonful for sheep.

Asafetida Tincture.—Use 6 to 8 tablespoonfuls for cattle; 4 tablespoonfuls for horses; 1 tablespoonful for sheep; 1 to 2 scant teaspoonfuls for pigs.

Baking Soda (Sodium Bicarbonate).—Use 4 tablespoonfuls for cattle; 2 tablespoonfuls for horses; 1 to 2 teaspoonfuls for sheep and hogs. Good for indigestion, constipation, wind colic. Has the faculty for reducing gases and sweetens the stomach.

Belladonna, Fluid Extract.—Use 1 scant teaspoonful for cattle; $\frac{1}{2}$ scant teaspoonful for horses; 20 drops for sheep; 3 drops for pigs. Given with good effect in severe colic, fevers, caked bag, and lockjaw.

Blue Vitriol.—Use 2 tablespoonfuls in a pint of water. This is a good antiseptic and also astringent. Cleaning wounds is the usual use for it.

Borax.—Used chiefly for skin treatments. It is also used for sore mouth. Borax is a good germ killer. It is an antiseptic and will "bind up" the bowels.

Boric Acid.—Dissolve in water all that can be held without settling. This is one of the finest of the antiseptic medicines. It is not poisonous and can be used on any part of the body.

Buchu, Powdered Leaves.—Use 1 to 7 tablespoonfuls for cattle; 1 to 5 tablespoonfuls for horses; 1 tablespoonful for sheep and hogs. These can be used as diuretics. Will develop heat and sweat quickly.

Butter of Antimony.—Used mostly as an external application. It is usually applied in salvé form for cleansing sores. Fine for foot-rot and any sore on the body.

Calomel.—Use 1 to 2 teaspoonfuls for cattle; 30 drops to 1 teaspoonful for horses; 8 to 20 drops for hogs and sheep. It has a good effect as a purgative and for intestinal worms. When used in dry form it is good for healing open wounds.

Camphor.—Use 2 good tablespoonfuls for cattle; 3 teaspoonfuls for horses; $\frac{1}{2}$ teaspoonful for hogs; 2 small teaspoonfuls for sheep. Give in half a cup of water. This makes a fine remedy to relieve nausea, colic, diarrhea, coughs and to stop pain in a wound. Good for lameness and if applied to bag will stop milk flow.

Cantharides, or Spanish Fly.—Used often in powdered form—1 teaspoonful mixed with seven level teaspoonfuls of lard, and applied externally makes a good blister. A drop or two given in a handful of grain tends to excite the generative organs.

Capsicum.—Use 1 to 3 teaspoonfuls for cattle; 1 to 2 teaspoonfuls for horses; $\frac{1}{2}$ teaspoonful for sheep and hogs. This is a spicy drug and acts in such a way as to diminish the effect of a stronger drug. This is a good stimulant.

Carbolic Acid.—Use 2 small teaspoonfuls in a cup of water. This is used as an antiseptic and aids in healing wounds and sores. It keeps flies away. This is very poisonous and burns the body if not diluted.

Castor Oil.—Use 1 cupful for cattle; 3 cupfuls for horses; 4 tablespoonfuls for sheep and pigs. This is used as a purgative and is well known.

Charcoal.—Very good for sweetening the stomach and absorbing gas. Can be given as half burned wood. Good if applied to open sores.

Chloroform.—Used to relieve or deaden pain and to produce sleep. A little poured on a handkerchief and held to the nostrils of an animal quiets it quickly. Very seldom given internally.

Cinchona, Powdered Bark.—Use 1 to 4 tablespoonfuls for cattle; 1 to 3 teaspoonfuls for horses; $\frac{1}{2}$ teaspoonful for sheep and hogs. A very good tonic.

Copperas.—Use 2 teaspoonfuls for cattle; 1 scant teaspoonful for horses; 20 drops for sheep; 10 drops for pigs. This is a very good blood tonic and is good for animals in a rundown condition. It will also stop looseness of the bowels. It is usually mixed with the food.

Corrosive Sublimate.—Use 1 small drop in three or four big tablespoonfuls of water. Very good as an antiseptic and for disinfection. It is very poisonous, so should be handled with great care.

Creolin.—Use 1 teaspoonful to a pint of water. Good especially where quantities are used. Antiseptic action. Many farmers use it as a mange cure and for lice.

Digitalis.—Use 20 to 30 drops for cattle; 10 to 20 drops for horses; 5 drops for sheep and hogs. This is one of the five most valuable medical drugs. Very good as a quieter, soothing pain and quieting the nerves.

Epsom Salts.—Use 1 to 2 pounds according to size, for cattle; 1 pound for horses; 3 to 5 ounces for sheep and hogs. This is very effectively used as a purgative. Dissolve salts in warm water and give as a drench.

Fenugreek.—Use 2 to 6 tablespoonfuls for cattle; 1 to 5 tablespoonfuls for horses; 1 to $1\frac{1}{2}$ tablespoonfuls for sheep and hogs. This is a good ingredient usually found in stock foods. It is a good stimulant.

Gentian Root.—Use 4 level teaspoonfuls (powdered) for cattle; 2 level teaspoonfuls for horses; $\frac{1}{2}$ teaspoonful for sheep and hogs. This is one of the most useful of farm drugs. In many localities it can be dug from the woods. It is used as a bitter tonic and especially in condition powders.

Ginger.—Use 2 good tablespoonfuls for cattle; 1 good tablespoonful for horses; 1 to 2 teaspoonfuls for sheep and hogs. Very good as a stimulant and to relieve sickness of the stomach. Reduces gas if combined with soda.

Glauber's Salts.—Use 1 to 2 pounds for cattle; 1 pound for horses; 4 to 6 tablespoonfuls for sheep and hogs. Very good purgative for all animals that have two or more stomachs. It is dissolved in water and given as a drench.

Glycerine.—Given as an injection. Very good for healing inflamed bowels. Keeps sores from becoming hard.

Iodine.—Use in tincture form, 30 drops or a scant half teaspoonful for cattle; 20 drops for horses; 10 to 15 drops for sheep and hogs. Good application for diminishing swellings, wind-puffs and ringworms. Very good as a blood purifier.

Jamaica Ginger.—Use 2 ounces for cattle; 2 big tablespoonfuls for horses; 1 tablespoonful for sheep and hogs. This is an excellent stimulant and can be used in the place of alcohol or whiskey. Can be used in combination with other medicines where whiskey or alcohol was formerly used. Very good for stomach troubles. The best way to give this is in milk.

Juniper Berries.—Use 2 to 5 tablespoonfuls for cattle; 2 to 4 tablespoonfuls for horses; 1 to 2 tablespoonfuls for sheep and hogs. These are good for increasing the flow of urine and sweating.

Kerosene.—Use 2 or 3 tablespoonfuls in a cup of olive or linseed oil for cattle; 2 tablespoonfuls in linseed oil or sweet oil for horses. Very good given internally for worms and externally to blister or to cleanse deep cuts and wounds. Has the tendency to heal a wound from the innermost surface. Keeps away flies.

Lard.—Use 1 pint of warm lard for cattle; 1 pint for horses; 1 cupful for sheep or hogs. Given internally to relieve bloat, indigestion and constipation. Externally it may be mixed with turpentine, kerosene or cantharides for sores or blisters.

Lime.—Use 2 tablespoonfuls for cattle; $\frac{1}{2}$ to 1 tablespoonful for horses, $\frac{1}{2}$ teaspoonful for sheep and hogs. This is good for strengthening the bones in animals. When used in liquid form mix with fresh water and allow to settle. Very good as a disinfectant and can be sprinkled about in the dry form.

Linseed Oil, Raw.—Use 1 to $1\frac{1}{2}$ quarts for cattle; $\frac{1}{2}$ to 1 quart for horses; 1 to 2 cupfuls for sheep and hogs. This is used as a purgative and is very soothing and healing to the bowels. It is used as a drench and in combination with other medicines.

Mustard.—Use as an emetic and especially for poulticing to draw out inflammation. Can be applied to any part of the animal's body as a counter-irritant.

Nux Vomica.—Use 2 teaspoonfuls for cattle; 1 level teaspoonful for horses; 10 to 15 grains or a little on the tip of a small spoon for sheep and hogs. This is poisonous, but is used for animals in a rundown condition. Very good when used in condition powders. Acts as a stimulant.

Peppermint, Essence of.—Use $\frac{1}{2}$ teaspoonful for cattle; 20 drops for horses; 5 to 10 drops for sheep and pigs. Give in warm water with sugar. Used in colic and indigestion for pains in the stomach.

Resin.—Use $\frac{1}{2}$ to 1 tablespoonful for cattle; 5 teaspoonfuls for horses; 1 to 2 teaspoonfuls for sheep and hogs. This has a very good effect on the kidneys of all animals and is quite often used as one of the ingredients in condition powders and stock foods. This is given in the ground or powdered form.

Salt.—Good when used as an antiseptic. Keeps animal in condition. Always give animals plenty of salt.

Saltpeter.—Use 2 to 3 tablespoonfuls for cattle; 2 tablespoonfuls for horses; 1 to 2 teaspoonfuls for sheep and hogs. Stimulates kidneys, reduces fever and watery swellings. Good blood purifier.

Sulphur.—Use 1 tablespoonful for cattle; 1 tablespoonful for horses; $\frac{1}{2}$ to 1 teaspoonful for sheep and pigs. This is good for lice, internally or externally, and a blood purifier.

Sweet Spirits of Nitre.—Use 4 to 6 good tablespoonfuls for cattle; 2 to 4 tablespoonfuls for horses; 2 to 4 teaspoonfuls for sheep and hogs. This should always be kept on the farm. It is very good for sudden attacks of colic, indigestion, inflammation of the kidneys and reduces fever.

Turpentine.—Use 4 to 6 tablespoonfuls for cattle; 1 to 4 tablespoonfuls for horses, 1 to 3 teaspoonfuls for sheep and hogs. This is fine for colic, worms, bloat, and is good as a stimulant or externally as a liniment. It can be mixed with lard if applied to a wound.

Vinegar.—(See Acetic Acid).

BEES.

The bee industry is becoming one of the profitable and interesting occupations for people on small farms, and as "extra" work for the boys and girls on the farm. There is a great opportunity for development. As the industry itself is so little known, many fine articles which are written do not reach the people who wish to read them. Such topics as "Beginning with Bees," "Wintering," "Feeding and Breeding," "Diseases of Bees," as well as articles on Honey, Combinations of Bees and Poultry, Bee Outfits, etc., can be obtained from specialists in this line. The Government has a number of good documents. Various State Experiment Stations are good sources. A very well recognized organization that takes pleasure in the distribution of bee literature and information is the A. T. Root Bee Company of Medina, Ohio.

LIVE STOCK BIBLIOGRAPHY

MANY stockmen enjoy having a more or less complete library of books treating in detail and at length the numerous subjects and phases of live stock husbandry. A few of the best books on important subjects and two of the most generally read live stock periodicals follow. The publishers of "The Stock Book," will gladly help you to secure them:

"Types and Breeds of Farm Animals," Plumb.

"Judging Farm Animals," Plumb.

"Breeding Farm Animals," Mumford.

"Feeds and Feeding," Henry and Morrison.

"Dairy Cattle and Milk Production," Eckles.

"Beef Cattle Production," Mumford.

"Pork Production," Day.

"Sheep Management," Kleinheinz.

"Horse Production," Gay.

LIVE STOCK PERIODICALS

"Breeder's Gazette," Chicago, Ill. A weekly publication devoted to all classes of live stock.

"Hoard's Dairymen," Fort Atkinson, Wis. A weekly journal devoted to dairy farming.

GLOSSARY

- Abbatoirs**—Slaughterhouses.
- Abrasion**—A breaking of the outer layer of the skin or mucous membrane.
- Absorptive**—Having power to absorb.
- Accessories**—Assistants.
- Accrue**—To increase.
- Acidulation**—Act of making moderately sour or acid.
- Aerate**—To expose to action of air.
- Aerated**—Supplied or impregnated with common air.
- Agar**—Sea weed.
- Aggregate**—To collect into a mass.
- Albuminous**—Containing albumen.
- Alveoli**—Deep cavities in the receptacles of composite flowers, as the cotton-thistle.
- Annual**—Yearly; returning every year.
- Anthracose**—A destructive disease of plants usually manifested by discolored spots.
- Antiseptic**—Preventing or destroying putrefaction.
- Aperture**—Opening.
- Aphid**—Bee-like insect.
- Aphids**—Plant lice.
- Appendicular**—Like a small appendage.
- Aspergillus**—Brush used by priests to sprinkle holy water.
- Assimilate**—To take up or change a thing or element, to make it harmonize with another.
- Assimilated**—Incorporated or transformed into a homogenous part of something.
- Astringent**—An agent producing contraction of organic tissues.
- Autopneumatic**—Self-operated by air.
- Awn**—One of the barbed appendages known collectively as the beard, in barley, oats, etc.
- Bacterial**—Pertaining to or consisting of bacteria in the widest sense; resulting from or caused by bacteria.
- Bacterial**—Resembling bacteria.
- Barrel**—Name given to large stomach of horse or cow.

Biennial—Occurring every two years.

Biliary—Conveying the bile.

Bolls—Pods of a plant.

Calcareous—Containing lime.

Cam—A wedge-shaped clamp which moves about an axis.

Canula—Small tube left in wound after tapping to enable escape of air or fluid.

Capillary—A minute blood-vessel.

Capsicum—A large tropical herb, the pulverized berries of which are used as a stimulant and counter irritant in neuralgia and rheumatism. Also used as a spice.

Carbohydrates—Vegetables containing fats.

Carbolized—Filled with carbolic acid.

Carbonaceous—Containing or composed of carbon.

Carunculations—Fleshy elevation of surface.

Cast—To throw.

Catalpa—Genus of American and East Indian trees.

Cauterize—To burn over.

Cellulose—Containing cells.

Centrifugal—Radiating from center.

Chime—Edge or border.

Chufas (pl. of chufa)—A kind of sedge of southern Europe. It produces small edible tubers of which hogs are fond.

Circulis—Any snout beetle.

Coagulate—To curdle; clot; congeal; to form into a compact mass.

Collards—A variety of kale, used as a green vegetable. Found mainly in South.

Colocynth—A drastic cathartic, causing a watery discharge.

Colostrum—The first milk of a mammal after giving birth.

Combustible—That may be set on fire and burned.

Commutator—A device to change the direction or strength of an electric current.

Complication—Combination of diseases.

Component—Helping to form; a part.

Composted—Manured.

Compress—A folded piece of cloth used over a wound.

Compressor—A device for producing a graduated pressure upon an object.

Concentrates—Something reduced to state of purity.

Conclave—Gathering.

- Concretion**—Act of growing together.
- Conspicuous**—Plainly visible.
- Constituents**—Elements, or component parts.
- Constitutional**—Inherited disease; those that are general or that pervade the whole system.
- Contributory**—Pertaining to giving jointly in common with others for a common purpose.
- Convalescence**—The period of recovery after disease.
- Copulation**—Sexual connection.
- Correlation**—A mutual or reciprocal relation, as of part to part, or of parts to a whole.
- Corrosion**—Eating away.
- Corrosive**—A substance that eats away or destroys.
- Costive**—Constipated.
- Cropping**—To cut off the tops or tips of; to reap.
- Culms**—Jointed stems of grass which are usually hollow except at the nodes.
- Curbs**—An inclosing frame, border or edging. An edging of upright stone along the outer limit of a sidewalk.
- Cuspidor**—A spittoon.
- Cylinder**—Long tube.
- Debilitant**—An agent allaying excitement; weakening.
- Debris**—Ruins; rubbish.
- Decomposition**—Decay; the analysis of a body; disintegration.
- Delirium**—A temporary state of mental disturbance, manifested by irritation and confusion.
- Demarcation**—The limit boundary, or lines so fixed or determined.
- Depleted**—Reduced, lessened or emptied.
- Desquamation**—The separation or shedding of the cuticle or epidermis in the form of flakes or scales.
- Dilator**—An instrument for stretching a cavity; also a dilating muscle.
- Distillation**—Vaporization of a liquid with subsequent condensation.
- Diuretic**—A medicine increasing the flow of urine.
- Dividends**—The profits apportioned among shareholders.
- Dolomite**—A marble-like substance consisting of calcium-magnesium carbonate.
- Dropsical**—Diseased with dropsy; tending to dropsy.
- Ecraseur**—A wire loop or chain for amputating.
- Effusion**—Pouring out of liquid.

Elements—Essential parts of anything.

Emaciated—Wasted away in flesh.

Emaciation—A loss of flesh; leanness.

Emasculation—Act of removing testicles.

Emasculator—One who castrates.

Embryonic—Pertaining to the embryo.

Emmer—A hardy cereal grain, related to spelt, commonly cultivated in Russia and Germany where it is used as stock feed and is also made into gruel and porridge.

Endive—An annual or yearly plant with long root.

Endosperm—The nutritive tissue formed within the embryo sac in seed plants.

Enteritis—Inflammation of the bowels

Enumerated—Named one by one.

Epithelial—Pertaining to epithelium.

Epithelium—Tissue forming outer layer of mucous membrane.

Erosion—Act of wearing away.

Erroneous—Incorrect, mistaken.

Erysipelatous—Pertaining to or of the nature of erysipelas.

Escutcheon—Any shield-shaped surface or device.

Essential—Necessary; substantial.

Eucalyptus—A tree native of Austria and Tasmania; Eucalyptus oil made from the leaves.

Eustachian Tube—Canal to supply air to part of ear.

Evacuation—Defecation; the act of voiding.

Excreta—Waste matter eliminated from the body.

Excretion—The discharged waste products of the body.

Expectoration—The expulsion of the secretions from the chest.

Extenuating—Diminishing.

Fallacy—Unproved statement.

Fanging—Seizing, grasping.

Feces—Sediment after infusion or distillation; dregs; refuse; excrement.

Feldspar—An important constituent of rocks.

Flat—Any field growing a crop.

Flatulence—The presence of gas in the digestive canal.

Flatulent—Characterized by flatulence.

Floats, Float—A heavy platform of planks for drawing over the soil to compact it and improve its mechanical condition.

Foetus or Fetus—The product of conception after fourth month of gestation.

Frenching—A fungus disease of uncertain nature affecting plants, causing the leaves to lose color and die.

Fundamental—Essential; indispensable.

Fungicides—Any substances that destroy fungi.

Fungoid—Character of fungus.

Generation—Process of producing offspring; reproduction; descent; genealogy.

Germinate—To sprout.

Gestation—The act of bearing; pregnancy.

Get—Offspring; breed.

Gilts—Young sows.

Girdled—Enclosed; bound with a belt or sash.

Glaciated—Acted upon by ice and snow.

Globular—Globe-shaped.

Glucose—A syrup obtained by imperfect conversion of starch into sugar.

Haw—Third eyelid of horse.

Hectic—Habitual; reddening of the cheeks in tuberculosis.

Helebore—A genus of herbs.

Herbaceous—Pertaining to or having the characteristics of an herb; herb-like.

Hernia—A protrusion consisting of an organ or part projecting through some natural or accidental opening in its natural cavity.

Humus—Dark colored substance formed by the decay of vegetable matter.

Hydrated—Combined with water.

Igneous—Pertaining to or resembling fire.

Immune—Safe from attack.

Impalpable—Not capable of being felt.

Impervious—Not capable of being penetrated.

Impervious—Permitting no passage into or through; impenetrable.

Impoverished—Reduced to poverty; poor.

Incrustation—The formation of a crust.

Indiscriminate—Making no difference or distinction.

Infection—The communication of disease germs.

Infiltration—The act or process of filtrating or passing through.

Inoculated—(Soil) Having introduced special forms of micro organisms by means of infected soil or pure cultures to promote fixation and assimilation of free nitrogen and other beneficial activities.

Inoculation—The introduction of the virus of a particular disease into the system through the skin.

Insecticides—An insect destroyer.

Insoluble—A substance that cannot be dissolved.

Insulator—A device made of an insulating substance for preventing the passage of electricity, heat or sound.

Iodism—A morbid state produced by the use of iodine and its compounds.

Irreparable—That cannot be rectified or made amends' for.

Irritation—Excitement; stimulation.

Judicious—Wise; prudent.

Kafir—Indian millet.

Kainit—A natural salt used as a fertilizer.

Kalsomine—(**Calcimine**)—A wash consisting of a mixture of whiting, with glue and water, often tinted.

Kaolin—A clay-like compact friable or mealy, pearly to earthy, white, grayish, or reddish hydrous, aluminum silicate.

Koumiss—Fermented mare's milk.

Laceration—A rending, or tearing of the flesh.

Lactation—Time of suckling or milk period.

Languor—Sluggishness, inaction or inertness.

Laquered—Paneled or spaced.

Laterals—A side ditch or canal.

Leaching—Sinking into ground.

Legumes—Pods of the seed-bearing plants, as beans and peas.

Leguminous—Relating to legume; bearing plants.

Lesions—A hurt; an injury. Med: Any morbid change in exercise of functions.

Lespedeza—One seeding; one jointed pod plant.

Levy—Collect.

Ligatured—Tied or stopped blood vessel.

Lobe—A projecting part, especially if rounded or globular, as of the ear or of a leaf or petal.

Lobes—Rounded part or projection.

Locknut—Nut to keep other nuts from slipping.

Loppered—Clotted; scoured.

Lupine—Any plant of the seed-bearing species.

Macule—A spot or blemish.

Malanders—Eruption on hock of horse.

Maturity—The state of being developed.

Mediocre—A middle quantity.

Metamorphic—Liable to variation or change; producing changes that go on in rocks.

Microscopic—Very small.

Minimum—A portion so small as to be incapable of further division; an atom.

Miscible—Mixable.

Moldboard—A curved plate of iron back of a plowshare. It turns over the earth in plowing.

Mottler—A brush used in mottling.

Mulch—A covering of the soil with any loose material.

Mummies—The embalmed bodies of human beings or sacred animals.

Muriade—A chloride.

Nasturtiums—A plant (dwarf or climbing) of any one of several species of the genus *Tropaeolum*.

Neutralize—To render ineffective.

Neutralizing—Checking the action of an agent.

Nitrifying—Combining or treating with nitrogen.

Nitrogenous—Containing nitrogen.

Non-symboliotic—Not mutual.

Obesity—Fatness; corpulence.

Oblique—Slant.

Obviates—Removes from the way or path.

Offal—Waste meat.

Omasium—The small stomach of the cow.

Optimum—Best or most favorable degree.

Organic—Showing animal or vegetable characteristics; pertaining to or having organs.

Paddock—Inclosed space

Palatability—State of being pleasing to the taste.

Palatable—Acceptable; agreeable to the palate or taste.

Palate—Roof of mouth.

Panicle—A tuft on plants.

Paroxysm—A spasm or fit; a convulsion.

Parturition—Act of bringing forth young.

- Pectin**—A white amorphous compound contained in various fleshy fruits as apples or pears.
- Peptones**—Products of digestion which cannot be precipitated by ammonium sulphate.
- Peptonized**—Converted into peptone. To digest or dissolve by a proteolytic ferment.
- Percolation**—Seeping through.
- Perennial**—Continuing through the year or through many years.
- Perforation**—State of being pierced through.
- Peritonitis**—Inflammation of the peritoneum or lining of the abdomen.
- Pestle**—Instrument used to pound or pulverize.
- Pictorially**—Representing in or as if in pictures.
- Piquancy**—Cleverness; brightness; sauciness.
- Plethoric**—Full-blooded.
- Pliant**—Flexible, easily bent or twisted.
- Polled**—Dehorned.
- Porosity**—State of being porous or containing holes.
- Port**—Hole for passage of steam or water.
- Potency**—Mental, moral or physical power.
- Potential**—Endowed with power; existing in possibility, not in actuality.
- Poulard**—A fat pullet.
- Poult**—A young chicken.
- Predisposition**—Previous inclination; tendency.
- Prepotency**—Superior, powerful.
- Progeny**—Offspring; descendants.
- Prolific**—Fruitful.
- Prolificacy**—Producing or reproducing. The quality of being prolific.
- Promiscuously**—Indiscriminately.
- Propagated**—To be produced or multiplied.
- Prostration**—Extreme nervous exhaustion.
- Protein**—Nitrogenous material in vegetable or animal substances.
- Pupa**—The intermediate, usually quiescent, form assumed by metabolic insects after the larval stage.
- Purulent**—Having the character of pus.
- Pustules**—Elevations resembling pimples or blisters.
- Putrefaction**—Decayed; process of putrefying.
- Pyrethrum**—Plant good for medicine.
- Quarantine**—To compel to remain at a distance without intercourse, when suspected of having contagious disease.

Raspacious—Given to plunder.

Rebushing—To furnish again with bush or lining.

Rectangular—Longer on two sides than on the ends.

Reeving—To pass through a hole.

Rejuvenation—To reinvigorate; to stimulate.

Residue—That which remains after a part is taken or removed; remnant; remainder.

Rotation (of crops)—The cultivation of a succession of different crops on the same piece of land before it is again planted with the original crop.

Roughage—Coarse fodder; any rough or coarse substance.

Rumen—Largest stomach of cow or sheep.

Saline—Consisting of salt or containing salt.

Sallenders—An eruption occurring on hind leg of horse; similar to malanders.

Scrofulous—Cold abscess.

Scurfy—Having or producing thin dry scales or scabs on the body; as dandruff.

Seasonal—Pertaining to a season.

Sedative—Soothing insidiously; treacherously.

Sedentary—Occupied in sitting.

Sedimentary—Having the character of sediment.

Sedimentation—Act or process of depositing sediment.

Semi-arid—Half barren.

Septic—A substance that promotes putrefaction.

Sequela (pl.) Sequelae—Followers, results.

Shanks—The lower part of the leg.

Shot (Surveying)—Range in general.

Shucks—Husks; bundles of sheaves.

Silt—Soil.

Siphon—Tube to draw liquid from well or container.

Siphonage—The action of a siphon or tube in conveying a liquid from one vessel to another at a lower level.

Sizing—Applying a liquid used by painters.

Slavor—Running at mouth.

Sludge—Material from waste soap, liquors or wool-scouring industries.

Sludge—Mud; mire; slush; to cover or fill in with soft mud or mire.

Soiling Crops—Those that enrich the soil for succeeding crops, such as the legumes, etc.

Soluble—May be dissolved.

- Solvent**—An agent capable of dissolving substances.
- Sordes**—Foul matter; excretion; useless matter. Med: The crust that collects on the teeth and lips in low fever.
- Spatula**—Broad bladed paddle or knife.
- Spelt**—A race of wheat having loose ears, the grains being hung triangular in cross sections.
- Spike**—An ear of corn or grain.
- Spores**—Any minute organization; germs.
- Spuddung**—Digging; removing.
- Stale**—Urine of horses or cattle.
- Stallioners**—Men who travel with stallions.
- Stanchion**—Upright bars, posts or timber forming a principal support.
- Stavesacre**—European and Asiatic larkspur. Seeds contain delphinine; a violent emetic and cathartic.
- Stimulant**—An agent increasing functional activity.
- Stover**—Fodder or food for cattle.
- Subcutaneous**—Lying beneath the skin.
- Subsequent**—Succeeding or following.
- Substantiate**—To verify.
- Succulent**—Juicy.
- Suffice**—To be enough.
- Sump**—Puddle or pool.
- Superficial**—Pertaining to surface; shallow.
- Supines**—Plants of the genus *Lupinus*.
- Susceptible**—Yielding readily; capable of being influenced.
- Symbiosis**—Living together.
- Symmetry**—Harmonious relation of parts. Similarity of parts on opposite sides of an axis or center.
- Tamped**—Packed down.
- Tankage**—Waste matter from tanks.
- Teosinte**—A large grass grown for fodder in many warm countries.
- Testicle**—One of the genital glands of the male in which spermatozoa and other portions of the semen are formed.
- Thurl**—To drill or bore; specifically in mining. Crossholes or ventilation passages between two headings.
- Tillage**—Preparing land for seed; cultivation.
- Tiller**—A sprout; a shoot.
- Tillering**—To put forth new shoots from the roots.
- Tilth**—Cultivation.

Topography—The description in detail of any tract of land, place or region; as in surveying a country.

Trachea—Windpipe.

Transpiration—A passing through or out; escape.

Trocar—Instrument for puncturing animals and letting out fluid or gas.

Turbidity—A disturbed condition.

Ulceration—The process of forming an ulcer, or becoming ulcerous.

Vehicle—A medium, as a liquid with which is mixed some other substance that it may be applied or administered more easily.

Velocities—Speeds.

Velocity—Swiftness; speed; to cover or fill in with soft mud or mire.

Vertebrae—One of the segmented portions of the spinal column.

Vesicles—Small blisters.

Vetch—A fabaceous plant; like a bean.

Viability—Ability to live.

Viability—Being capable of living.

Virus—A slimy or poisonous liquid. Med: The poison or contagium of an infectious disease.

Viscid—Viscous (See Viscous).

Viscous—A gummy substance produced in glutinous fermentation.

Vitrified—Turned or converted into glass; to resemble glass.

Vogue—Fashion; style; mode. To row; to soil.

Voided—Cleared or vacated.

Voracious—Greedy; hoggish.

Whorls—Turns.

Woolly Aphis—A woolly plant louse.

MEMORANDA

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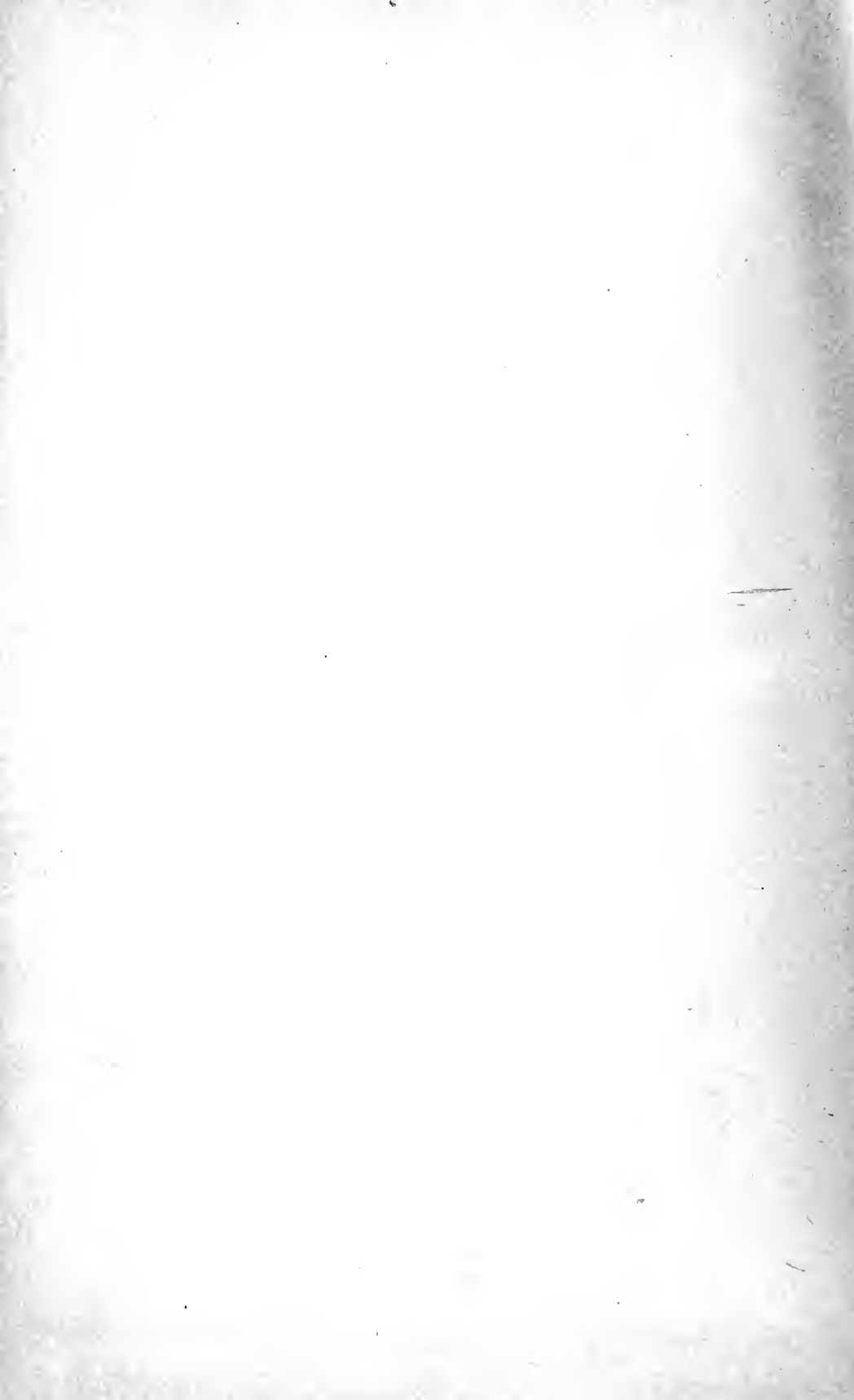
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